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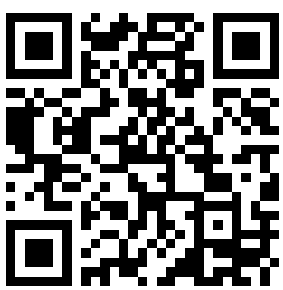

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US ARMY

ORDNANCE

CENTER AND SCHOOL

DEPOSITORY
OCT 20 1983
UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

MAINTENANCE COMPANY DEFENSE

ABERDEEN PROVING GROUND, MARYLAND 21005

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US ARMY ORDNANCE CENTER AND SCHOOL
Aberdeen Proving Ground, MD 1 February 1982

MAINTENANCE COMPANY DEFENSE

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CHAPTER 1. INTRODUCTION

1. GENERAL. FM 100-5, Operations, tells us that the Army's primary objective is to win the land battle - to fight and win in battles, large or small, against whatever foe, wherever we may be sent to war. We cannot know when or where the US Army will again be ordered into battle, but must assume the enemy we face will possess weapons generally as effective as our own. And we must calculate that he will have them in greater numbers than we will be able to deploy, at least initially in the opening stage of a conflict. Because the lethality of modern weapons continues to increase sharply, we can expect very high losses to occur in short periods of time. Likely to be out-numbered and faced with probable heavy losses, we will rely heavily on combat service support, especially maintenance units, to keep our Army's combat power at its full potential. The measure of effectiveness for combat service support units (and maintennance companies) is the percentage of weapon systems which are fully operational on the battlefield. Maintenance support, to be fully effective, will be located as far forward as possible so that damaged weapons systems can be returned to the battle as rapidly as possible. The maintenance company could therefore, find itself in the midst of battle, accomplishing its mission under enemy fire. Unless properly trained in combat skills and skillfully employed, the maintenance unit could be severely damaged or destroyed. This text will show ordnance leaders how to reduce their units' vulnerabilities.

2. PURPOSE. This special text is designed for the ordnance unit leader. It will assist him in the training of his soldiers in accomplishing their mission under battlefield conditions. Technical training is important for the day-to-day operations, but ordnance units do not always work in depots or cantonment areas. They also have to operate in a lethal environment on the battlefields of today and tomorrow. This text supplements, but does not replace, standard field manuals. Together with the Soldier's Manuals and ARTEP manuals, this text comprises the basic training references. This text directly supports resident training in professional development courses at the Ordnance School. Various checklists for unit moves and tactical operations are included. These may reproduced locally as leader aids and/or SOP items.

3. SCOPE. Maintenance companies have differences in allocation of personnel and equipment; however, the planning, organization, and conduct of the defense is similar to the methods presented in this text. The techniques utilized by these maintenance companies vary with the mission, enemy threat, and location of the unit. This text will present three different situations:

a. The nondivisional maintenance unit not collocated with other units.

b. The nondivisional maintenance unit in support of a cavalry regiment located in the regimental trains area.

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c. The divisional maintenance unit in support of a divisional brigade in the brigade trains area.

The defensive measures and concepts which are applicable to all types of maintenance units under all conditions are discussed in detail in the appendixes.

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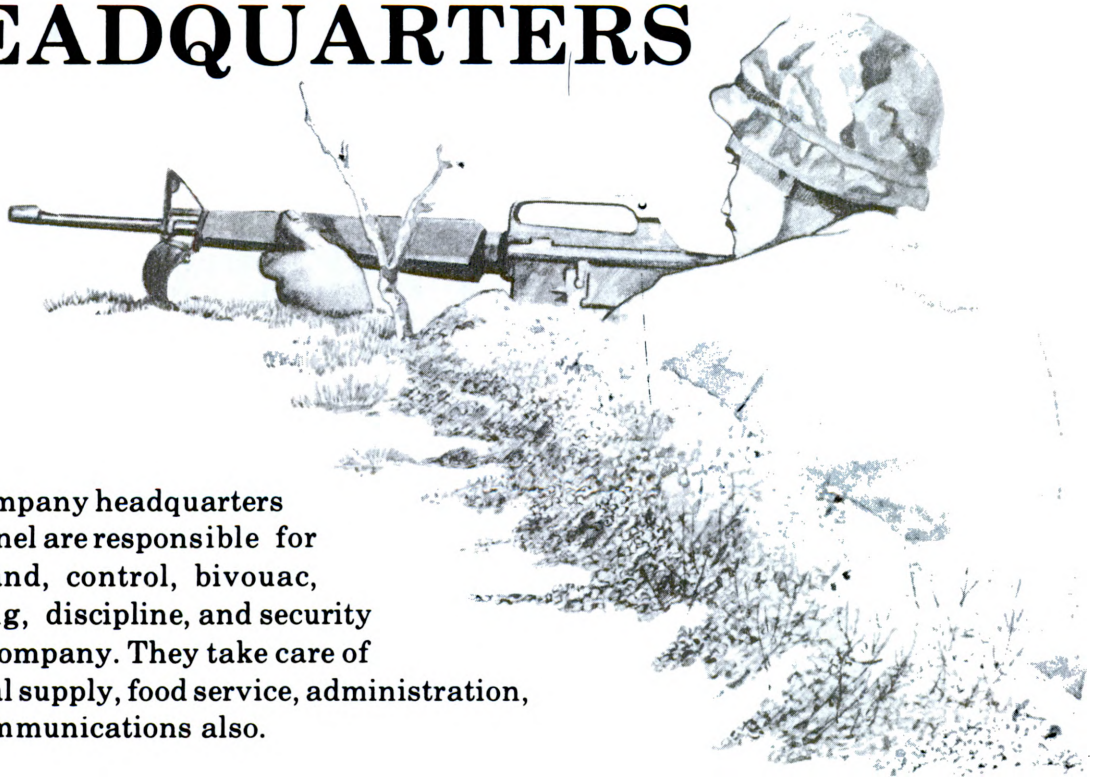
CHAPTER 2

COMPANY HEADQUARTERS



The company headquarters personnel are responsible for command, control, bivouac, training, discipline, and security of the company. They take care of internal supply, food service, administration, and communications also.

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Personnel	Basic Duties
Company commander	Commands the unit; directs and supervises the operation and employment of the unit; plans, directs, and manages the unit so that its assigned mission is carried out; is responsible for training, discipline, and security of the unit.
First sergeant	Is the commander's chief enlisted assistant; supervises the platoon sergeants in the training of individual soldiers; calls all formations; manages the command post; prepares duty rosters; represents the enlisted soldiers of the unit; serves as unit mail supervisor.
NBC operations NCO	Conducts training in methods and techniques of NBC defense; predicts effects of weather and terrain on chemical operations; prepares radiological fallout and chemical and biological downwind hazard predictions; prepares and evaluates NBC reports; computes radiation factors affecting personnel, equipment, and operations.
Food service sergeant	Supervises operation of the field kitchen; directs preparing and serving of food; maintains required food service records; makes sure the food service equipment is maintained; supervises headcount records and procedures.
First cook and cooks	Prepare and serve food; clean up afterwards.
Supply sergeant	Provides supply support for company operations; maintains the company supply records; consolidates and prepares requests for supplies.
Armorer	Performs small arms maintenance on all individual and crew-served weapons; assists the supply sergeant; drives the 2 1/2-ton truck assigned to company headquarters.
Unit clerk	Assists the company commander and first sergeant; types duty rosters and reports; performs other administrative and clerical tasks; assists the tactical wire operations specialist; serves as unit mail clerk.
Tactical wire operations specialist	Installs, maintains, and operates the field wire communications system.
Vehicle driver	Drives the 1/4-ton truck used by the company commander; operates the radio mounted in the vehicle.

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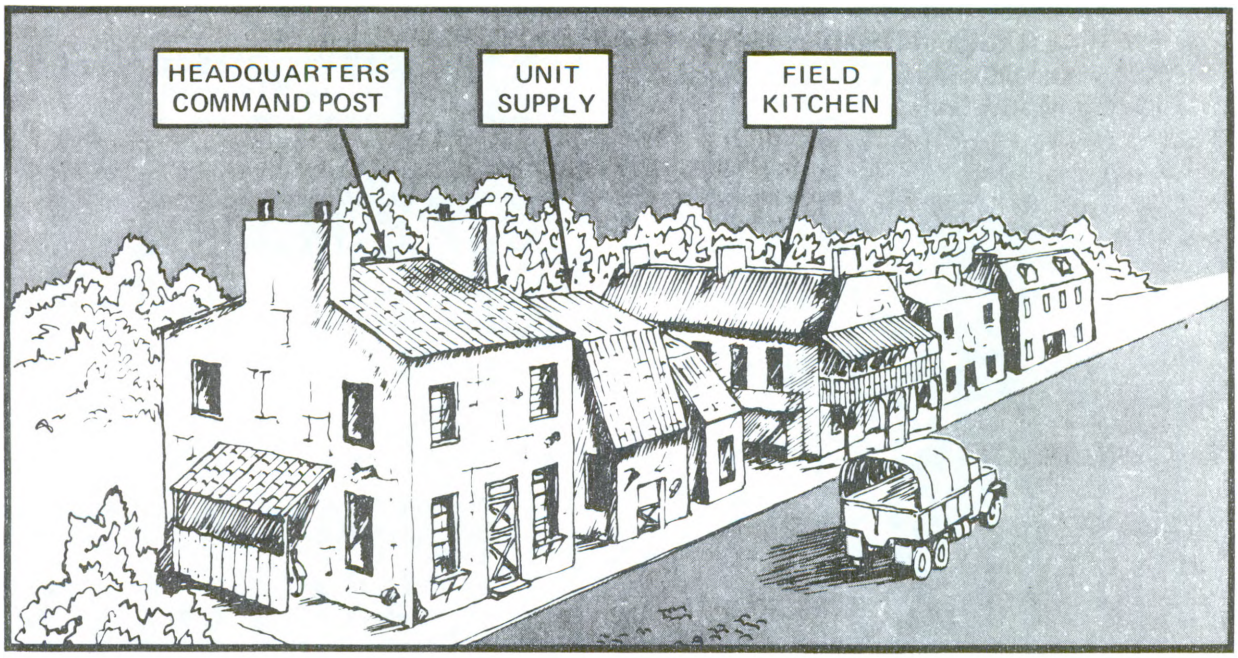

LAYOUT

Lay out your company headquarters with a command post, communications area (you'll probably want it in the command post), unit supply area, and field kitchen.

As commander, you are responsible for insuring that the unit's mission is carried out. This involves frequent decisions on your part to make sure that the operations of the various elements of the unit succeed. There are also many day-to-day operational procedures and functions that are not directly related to your unit's mission. You are responsible for these, too. Such things as personnel administration, supply, communications, security and defense, maintenance, and safety are a part of the successful performance of the unit's mission. A source of more detailed information is FM 25-2 (TEST)--the *Unit Commander's Guide.*

ADMINISTRATION

Administrative functions include maintaining duty rosters, initiating personnel actions, initiating actions affecting military pay, processing casualty-reporting information, maintaining unit files, overseeing unit mailroom operations, and SIDPERS (standard installation/division personnel system) actions. The consolidated administration at battalion level (CABL) concept does not apply to your company at present. As a rule, your company is located too far from the battalion for CABL to be effective. So administration is done at company level. However, if CABL does become effective for your company, you can expect to lose your unit clerk to battalion headquarters. Your standing operating procedure (SOP) should contain information on the administrative procedures your soldiers follow.

In addition to your SOP, your soldiers need the following references:

- ARs 65-75, 220-10, 220-45, 340-2, 340-16, 340-17, 340-18-1, 380-5, 380-51, and 604-5.

- DA Pams 310-1, 310-2, 310-3, 310-4, 310-13, 310-35, 600-8-1, and 600-8-8.

You can find the titles of these publications in the appendix.

UNIT SUPPLY

Besides equipment and personnel (as provided by TOE and MTOE documents), the company needs supplies if all operations are to run efficiently. You are responsible for supply administration and accountability.

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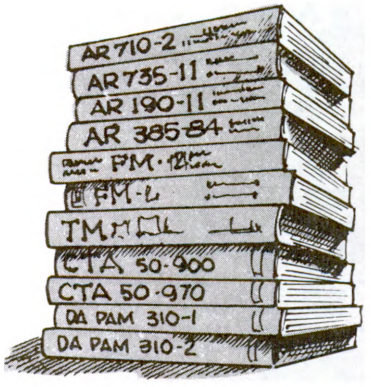
FM 10-14 (Unit and Organization Supply (Manual Procedures)) and FM 25-2 will give you and your soldiers the details you need to stay on top of the situation. You will need the following publications also:



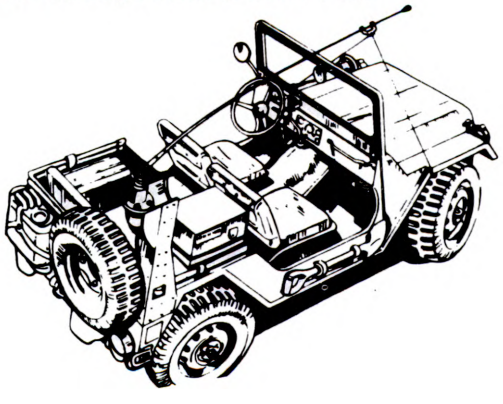
AR 190-11	*Physical Security of Weapons, Ammunition, and Explosives*
AR 385-32	*Protective Clothing and Equipment*
AR 700-84	*Issue and Sale of Personal Clothing*
AR 710-2	*Materiel Management for Using Units, Support Units, and Installations*
AR 735-11	*Accounting for Lost, Damaged, and Destroyed Property*
DA Pam 310-4	*Index of Technical Publications*
DA Pam 310-6	*Index of Supply Catalogs and Supply Manuals (Excluding Types 7, 8, and 9)*
CTA 50-900	*Clothing and Indvidiual Equipment (Active Army, Reserve Components, and DA Civilian Employees)*
CTA 50-909	*Field and Garrison Furnishings and Equipment*
CTA 50-970	*Expendable Items (Except: Medical, Class V, Repair Parts, and Heraldic Items)*
SB 700-20	*Army Adopted/Other Items Selected For Authorization/List of Reportable Items*
DA Pam 310-1	*Index of Administrative Publications*
DA Pam 310-2	*Index of Blank Forms*

COMMUNICATIONS

The company's communications system is one of the most important keys to effective operations. You need a good communications system so you can accomplish the unit mission, carry out unit administration, maintain contact with higher headquarters, transmit tactical information, and defend the unit. Also, you need to keep in close touch with your subordinate elements. They, in turn, need to keep in touch with other company personnel, battalion headquarters personnel, supply and service company personnel, and supported units.

You are authorized radio and telephone communications equipment. The organic wire net is installed and operated by a tactical wire operations specialist.

Radio. Your radio set (AN/VRC-46) is provided for use in the company headquarters. The set comes mounted in a 1/4-ton truck. If the radio is kept at the command post it should be ground mounted. The radio is used mainly to contact higher headquarters and supported units, and other support units. Use it as another means of communications if wire networks are destroyed or interrupted. You may also use the radio in rear area combat operations (RACO) and area damage control activities.



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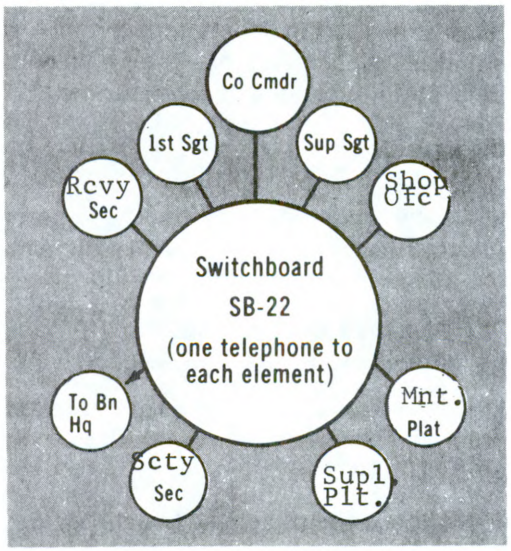
Telephone. The organic wire net (shown below) is made up of an SB 22/PT manual telephone switchboard and eight TA-312/PT telephone sets. The switchboard is connected to the nearest switching center that can contact the area communications center and higher headquarters. Allocate telephone sets to key personnel of the company as shown:



Your personnel will also need the following publications:

DA Pam 310-9,
Index of Communications Security (COMSEC) Publications

TM 11-5805-201-12,
Operator and Organizational Maintenance Manual, Including Repair Parts and Special Tool Lists: Telephone Set TA-312/PT (TO 31W1-2PT-291)

TM 11-5805-262-20P,
Organizational Maintenance, Repair Parts and Special Tool List for Switchboards, Telephone, Manual, SB-22/PT and SB-22A/PT

TM 11-5820-401-10-1,
Operator's Manual: Radio Sets AN/VRC-12 (NSN 4820-00-223-7412), AN/VRC-43 (5820-00-223-7415, AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435) and AN/VRC-49 (5820-00-223-7437)

ELECTRONIC WARFARE (EW)

You know communication is a vital part of your operations. The enemy knows this, too, and he will do his best to find out what's going on. He will listen, identify you, locate you, and try to destroy you. If he can't destroy your communications, he will try jamming them (noises or sounds that foul up your communications) or deceiving you (imitating your communications to make you do what he wants).

You need to be prepared for this and take effective electronic countermeasures (ECM) before, during, and after communication. Place the radio where there is a barrier (buildings, trees, hills) between you and the enemy. Let the operator turn the radio on only when he has to. Transmit on low power. You can use brevity lists and abbreviated call signs to keep communications brief. Know what you want to say, say it, and then get off the air. If the enemy tries to deceive you, make him authenticate. And in any case, you should fill out a Meaconing, Intrusion, Jamming Interference (MIJI) Report and send it to higher headquarters. From this report the enemy can be located, jammed, and destroyed. FM 32-20 and FM 32-30 will give you more details about dealing with EW.

FIELD KITCHEN

You and your people have to eat. So, as soon as you can, have your food service sergeant set up the field kitchen. The field kitchen will probably have to work on a 24-hour basis.

Units work at odd hours. Consequently, personnel of these sections may have to eat at odd times. Have your food service sergeant schedule meals so that everyone gets at least one hot meal a day when the tactical situation permits. Also, it may be necessary for personnel of the sections to be served meals in shifts. This helps avoid breaks in production schedules and helps avoid a crowded dining area. FM 10-23-1 is the *Commander's Guide to Food Service Operations*. FM 10-23 (Army Food Service Operations) covers troop feeding operations, including the use of the mobile field kitchen (MKT-75).

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BIVOUAC

Not only do you have to see to it that your operations sites are set up so that you can carry out your mission, but you also have to see to it that your personnel are housed. The factors you consider when you select operations sites apply also to the selection of the bivouac area for your soldiers. Usually, the bivouac area will be in the area of operations. Use existing buildings if they are available, but make sure sanitation standards are met. If no buildings are available, look in CTA 50-909 to see what tents you are authorized. Submit a requisition to the nearest general supply organization to get them. In any event, follow camouflage procedures.

MAINTENANCE MANAGEMENT

You are responsible for correct operation and maintenance of organizational equipment, but your role is basically administrative. Individual users, operators, and supervisory personnel are responsible for the correct operations, care, and maintenance of organizational equipment based on the procedures outlined in technical manuals (TMs) dealing with the specific equipment.

The following checklist shows you areas of concern you need to stay on top of, and it tells you where to go for information:

SAFETY

Safety rules and regulations set down safe methods and practices for insuring continuous operations, safeguarding personnel, and preventing property damage. Without safety rules, accidents and injuries could occur and seriously hamper your unit's operations. A safety program deals with the responsibilities of the commander, supervisors, and individuals; principles of safety; the unit's safety plan; and special precautions.

Responsibilities

CO:

- Appoint a safety officer to supervise and coordinate all safety activities within the unit.
- Appoint a safety committee to be made up of the platoon leader and section chiefs.
- Make sure all activities of your unit are conducted according to established safety rules.
- Determine the cause of accidents.
- Take corrective action at once to keep them from happening again.
- Stay on top of and enforce all safety regulations sent down from higher headquarters.

MAINTENANCE MANAGEMENT CHECKLIST

✓	Area of Concern	For Details, See
☐	Preventive Maintenance (PM)	DA Pam 750-1, FM 25-2, and the appropriate TMs for the equipment
☐	Organizational Maintenance • Equipment operators • Organization mechanics	DA Pam 750-1, FM 25-2, chapter 10 of this manual, and the appropriate TMs for the equipment
☐	Direct Support (DS) Maintenance	FM 54-9 and FM 25-2
☐	TAMMS • Forms and Records	TM 38-750, AR 710-2, and FM 25-2
☐	Maintenance Assistance and Instruction Teams (MAIT)	AR 750-1 AR 750-51
☐	Unit Readiness • Unit readiness report • Readiness conditions (REDCON)	AR 220-1

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• Request permission to depart (if need be) from an established safety rule.

• Set up your own safety plan.

• Make sure there is a spirit of cooperation in the unit.

Supervisors (platoon leader and section chiefs):

• Keep an eye out (during day-to-day supervision) for working or training conditions that may become hazardous.

• Have frequent and regular meetings with your personnel to discuss safety.

Include such topics as:

• the overall job and the end results expected;

• the why, how, and when of the job and any ideas from the group on improvement of methods and procedures;

• the part played by each person;

• the existing and anticipated hazards and steps that should be taken to cope with them;

• the need for prompt reporting of all injuries, accidents, or near accidents and the importance of first aid;

• the need to detect and correct unsafe practices and conditions to prevent accidents and injuries;

• a system for routine safety inspections.

Individuals:

• Realize that safety rules are made for your protection and welfare.

• Follow all instructions and use tools, machinery, and equipment safely.

• Cooperate with each other in making and keeping safe workhabits.

Principles of Safety

The principles of safety can be summed up in the words **"accident prevention."** Some of the ways you can help prevent accidents are listed below.

Active interest. Emphasize safety vigorously and continuously. Your safety plan will fail unless your personnel are kept actively interested and are willing to take part in the program. Keep their interest by appealing to their sense of pride and the responsibilities each person has to himself and to the unit. Carefully consider each soldier's ideas for making operations safer. Give him full credit if the ideas are adopted, or tell him why if his idea is not practical. Your platoon leader and section chiefs are very interested in the effect of accidents on efficiency, combat readiness, and production. Give them facts and figures showing how accidents can affect the operations of their sections and how increased demands on production can increase the number of accidents.

Factfinding. Facts to find out in each accident include:

• who was injured or what was damaged?

• when?

• where?

• how severe or to what extent?

• the nature of the accident or injury?

• were safety rules in effect, and if so, were they followed?

• how did it happen?

• why?

Corrective action. To prevent future accidents, make changes based on the facts you find out. Don't forget near-accidents, and unsafe procedures, conditions, and other hazards that can be corrected before there is a serious accident. Be on the alert for those who seem to be accident prone. If you find anyone who is involved in more than one accident, place him where he is least likely to be a danger to himself or others.

The Unit Safety Plan

Consider all the special conditions of specific operations of the unit when you develop the unit safety plan. Give the plan your personal attention before you turn it over to your safety officer. Include the following in your safety plan:

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Accident reports. Set up a definite procedure for preparing and submitting DA Form 285 *(Accident Report). (See AR 385-40).* Emphasize that a full report must be made at once for all accidents or injuries, no matter how slight they may be.

Cause determination. Either you or your safety officer must investigate all injuries or accidents to find the cause. You must take corrective action so that they do not recur.

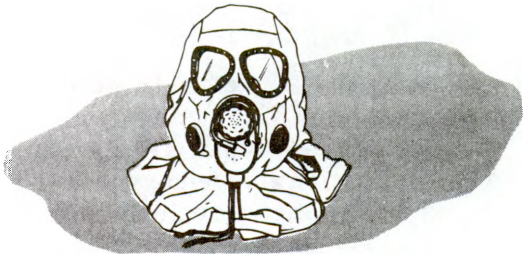
Use of damaged equipment. Stop the use of any damaged equipment. See to it that it is repaired or replaced. The use of damaged equipment can cause injuries.

Fire prevention. Make sure **NO SMOKING** signs are posted wherever there are fire hazards. Permit smoking only in designated safety areas. Firefighting equipment (TB 5-4200-200-10) should be available in all living, training, and work areas; and all personnel should know where it is and how to use it. The equipment should be checked once a month to make sure it is serviceable. See AR 700-68 for details.

Care of tools and equipment. All tools and equipment should be inspected regularly for defects. Special attention should be paid to the safe use of electrical items.

Vehicle operation. Qualified personnel should be trained to drive all of the vehicles or materials-handling equipment (MHE) so that they can work with them safely in an emergency.

Use of special clothing and equipment. Personnel may be required to use special clothing and equipment. Make sure that all of them are thoroughly familiar with the use, location, care, and inspection of such items. When the nature of a job requires them to use special clothing and equipment, make sure they use them.



Special Precautions

Explosives. You must make sure that explosives (ammunition, grenades, flares, demolition charges, and fuel) are stored correctly. Also, you must make sure access to them is limited.

Chemical fluids. Chemical fluids such as ammonia, battery acid, and cleaning compounds are very dangerous to personnel and equipment. They must be stored in an area separated from all other items. TM 3-250 gives more information on storing and handling hazardous chemicals.

Noise. Noise is usually not thought of as a hazard. But it is. Noise can cause permanent ear damage. The hearing loss may be gradual, and it may go unnoticed until the damage has been done. High-pitched whines can do a great deal of damage. To help reduce noise hazards:

- Muffle sounds as much as is safely practical.
- Locate activities that produce shrill or loud noises next to the downwind side of the perimeter, not in the center of the unit.
- Require everyone working in areas of excessive noise to wear earplugs or other protective devices.

Carbon monoxide. Carbon monoxide is dangerous because:

- it is the only poisonous gas given off by engines and fuel-burning heaters and by ammunition when it is fired that can't be seen or smelled. (These items give off other gases, but the gases irritate the eyes, nose, and throat.)
- the effects of carbon monoxide build up over a period of time, so amounts that are safe for short times are dangerous for longer times.

Therefore, make sure all engines and heaters in enclosed spaces are correctly ventilated.

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COMMANDER'S SOP

Your standing operating procedure (SOP) is a set of written instructions you issue to the company. **It is your most valuable administrative tool for insuring that everything goes smoothly.** A well-prepared SOP can save you headaches later on. You can make it cover just about anything you want it to. Make your SOP that covers company operations available to all personnel--it is their guideline. Change it when you need to meet changing conditions or modify existing practices. Also, make your SOP detailed enough so that new arrivals won't have any trouble using it.

The format for an SOP is not prescribed. Below is an outline of a sample SOP for a field service company. Use it or some other outline that suits your particular needs.

SAMPLE SOP OUTLINE

Part I. IMPLEMENTING ORDER

- Company designation
- Location or mailing address
- Date of issue
- Title
- What SOP applies to
- Who is responsible
- Signature

Part II. SUBJECTS

- General
  - Purpose and score
  - Mission
  - Assignment
  - Capabilities
  - Organization
  - Definitions (when needed)
- Personnel and Administration
  - Responsibilities of key personnel
  - Personnel administration
  - Military courtesy, discipline, and appearance
  - Sick call
  - Postal and religious services
  - Formations
  - Feeding
  - Classified information
  - Uniform
  - Morale support services (recreation)
  - Morale and personnel services
  - Individual personnel actions
  - Dealings with local civilians
- Intelligence and Handling of POWs
  - General
  - Essential elements of information (EEI)
  - Maps
  - Weather data
  - Collecting, processing, and giving out information
  - POWs and captured documents and materiel
  - Evaluating information
  - Counterintelligence
- Operational Reports
  - Spot report
  - Situation report
  - NBC reports
  - Patrol reports
  - POW and report of captured materiel
  - Booby trap/obstruction/mine report
  - Shell report
  - Aircraft report
  - Weather report
- Local Security and Defense
  - Responsibilities
  - Security and defense preparations
  - Camouflage
  - Area damage control
  - Air and artillery support
  - Ground/air attack warning system
- Movements (Convoy Operations)
  - Convoy organization
  - Distance between vehicles

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- Convoy procedures and control
- Convoy security
- Convoy marking and identification
- Reaction to ambush/NBC attack/air attack
- Transportation requirements
- Equipment and personnel status
- Advance party
- Night moves

■ NBC Defense
- Organization
- Duties and responsibilities
- Alarm and warning systems
- Procedures
- Protection
- Mission-oriented protection posture (MOPP)
- Entering and leaving contaminated areas

■ Supply
- Coordination
- Basic and prescribed loads
- Classes of supply
- Procedures

■ Communications
- Procedures
- Communications-Electronics Standing Instruction (CESI)
- Communications-Electronics Operation Instructions (CEOI)
- Messengers
- Precautions

■ Standard Bivouac
- Company HQ
- Maintenance Plt.
- Supply Plt.
- Recovery Sect.
- Shop Office
- Inspectors

■ Safety
- Responsibilities
- Procedures
- Vehicles
- Fires and fire extinguishers
- Noise hazards
- Accidents and accident reporting

■ Company Element Mission Operations
- Headquarters
- Maintenance Plt.
- Supply Plt.
- Recovery Sect.
- Shop Office
- Organizational maintenance

■ Training
- Responsibilities
- Objectives
- Directives
- Phases
- Equipment
- Schools
- On-the-job training
- Records and reports
- Field training exercises (FTX)

■ Weapons Accountability
- Procedures
- Accountability roster

Part III. ANNEXES

A. Effective downwind message
B. NBC 1 report
C. NBC 2 report
D. NBC 3 report
E. NBC 4 report
F. NBC 5 report
G. NBC 6 report
H. DA Form 1971-R (Radiological Data Sheet, Monitoring and Point Technique)
I. DA Form 1971-1-R (Radiological Data Sheet, Route Technique or Course Leg Technique)
J. Arm and hand signals
K. NBC signals/alarms
L. Convoy paces and intervals
M. FTX checklist

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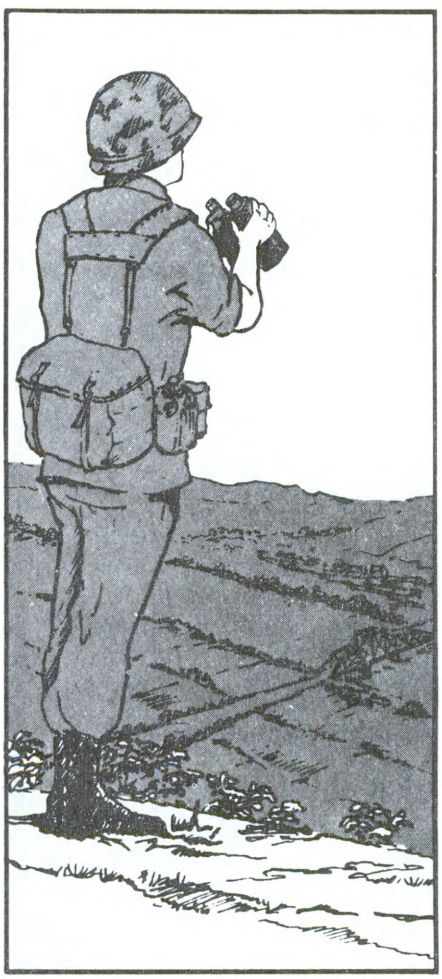
CHAPTER 3

RECONNAISSANCE and SITE SELECTION



Your battalion headquarters will probably select the general operating area for your company as part of the overall movement plan. As company commander, you must select the operating sites for the company elements.

WARNING ORDER

Your first notice of a move to a new site is a warning order. It tells you the general location in which to set up company operations, the date and time of the move, route information, interference to expect during the move, and when to start operating at the new site. Brief your officers and NCOs on the move as soon as you get the warning order. They will need time to assign duties and responsibilities, review loading and unloading plans, turn in excess supplies and equipment, compute final transportation needs based on the type of transportation to be used, and clear the area. They will also be able to give you data on the special needs and problems of their elements for this particular move.

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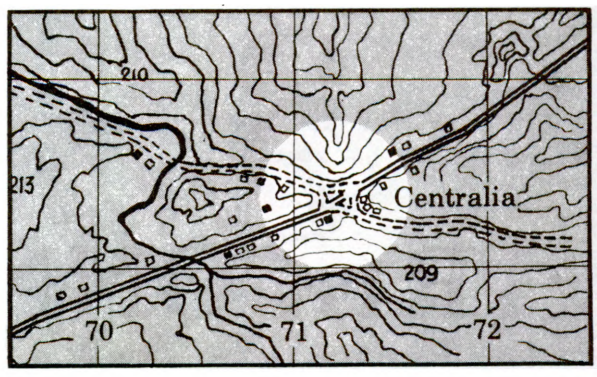
RECONNAISSANCE

After you receive the warning order, make a map reconnaissance of the area. Use current maps of the area and route or any available aerial photos. You are looking for a site that:

- is near to the main supply route (MSR)
- has good roads in and out of the area
- has buildings that can be used
- will not flood in a hard rain
- has parking areas for vehicles
- is easy to defend
- has natural concealment

Use ground reconnaissance along with map reconnaissance. Be sure to take representatives with you for on-the-site visit. Check out primary sites to see if they are all right; also, check out alternates if time permits or if primary sites are not suitable. However, each of your elements has certain needs that you should consider before making final site assignments. Some of the needs are:



No site is perfect. You will have to be flexible and adapt the site to suit your needs. Also, you will be scouting the route your company will follow.

This will give you information on:

- Conditions of the roads
- Bypasses and detours
- Type of terrain
- Critical points
- Distance between points
- Clearance and capacity for loads
- Location of bivouac site and rest halts
- Where to put road guides

Company Headquarters	Central location.
Recovery Sect.	Should have its own entrance and exit and space for heavy vehicle
Maintenance Plt.	Locate near Recovery to reduce traffic problems
Inspection Point	Locate near main entrance near shop office
Supply Plt.	Site it to have easy access to maint. area
Shop Office	Position it near main entrance to area

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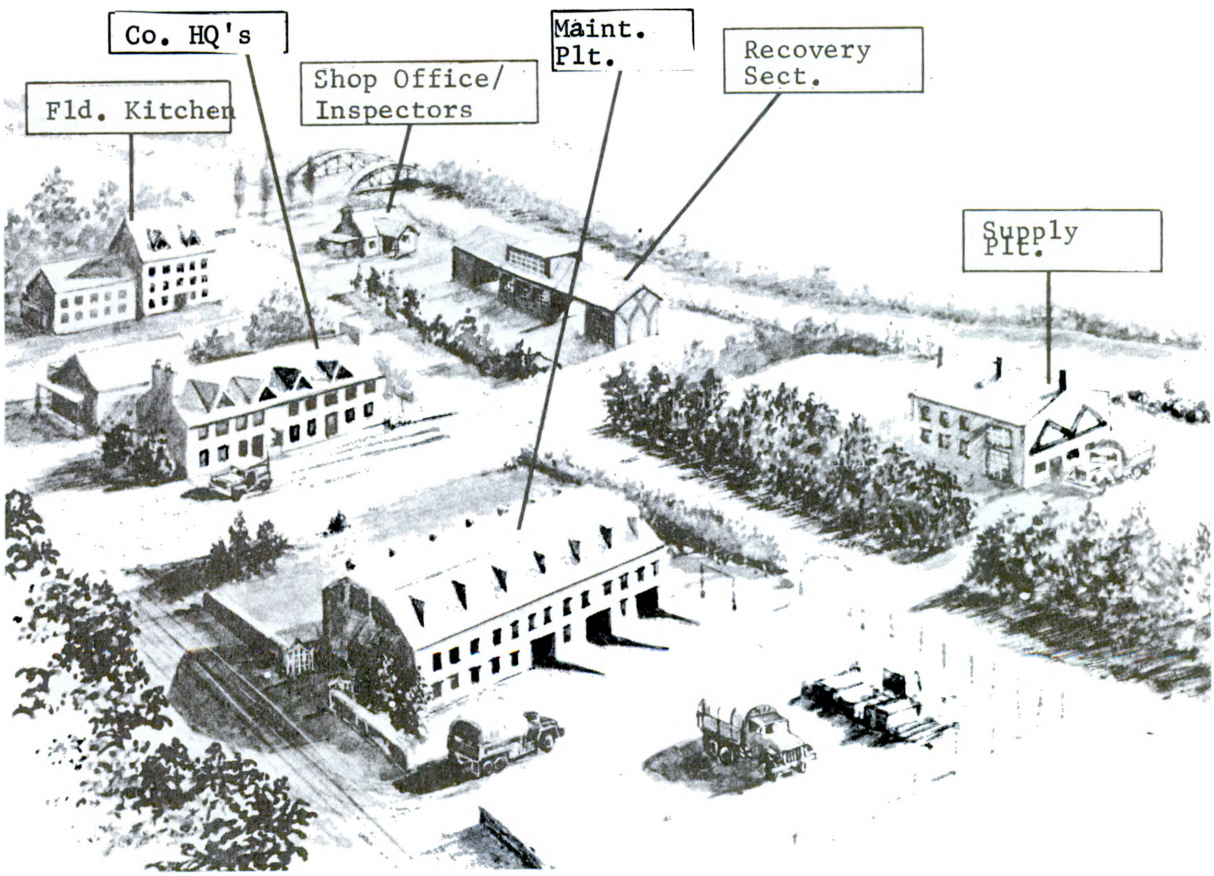
TOWN SITES

If you are assigned an operating area in a built-up area, things are a little different. For a general support unit, the built-up area will most likely be in an industrial suburb, a small city, or a large town. You may be lucky enough to find buildings which suit your needs. For example:

Structures can be further adapted for use by extending rooflines. You can also pitch tents to blend in with existing buildings. FM 90-10 (Military Operations on Urbanized Terrain (MOUT)) may provide you with more useful information.

Building	Use
• One of medium size with a basement	• Company HQ and for communications equipment
• An inn	• Field kitchen
• Large warehouse	• Supply platoon
• Factory	• Recovery section
• Garage	• Maintenance platoon
• A large warehouse	• Electronic maint. sect.
• A service station	• Organizational maintenance section



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SITE RECONNAISANCE CHECK LIST

1. Is the area big enough?
2. Is it defensable?
3. Does it provide cover and concealment?
4. Will local civilians create a problem?
5. Is it near units that are likely nuclear or chemical targets?
6. Does it lie on a major enemy avenue of approach?
7. Does it contain booby traps or contamination?
8. Will the ground support heavy traffic?
9. What effects will weather have on the area?
10. Is it near the MSR?
11. Are resources available (water, buildings, garages)?

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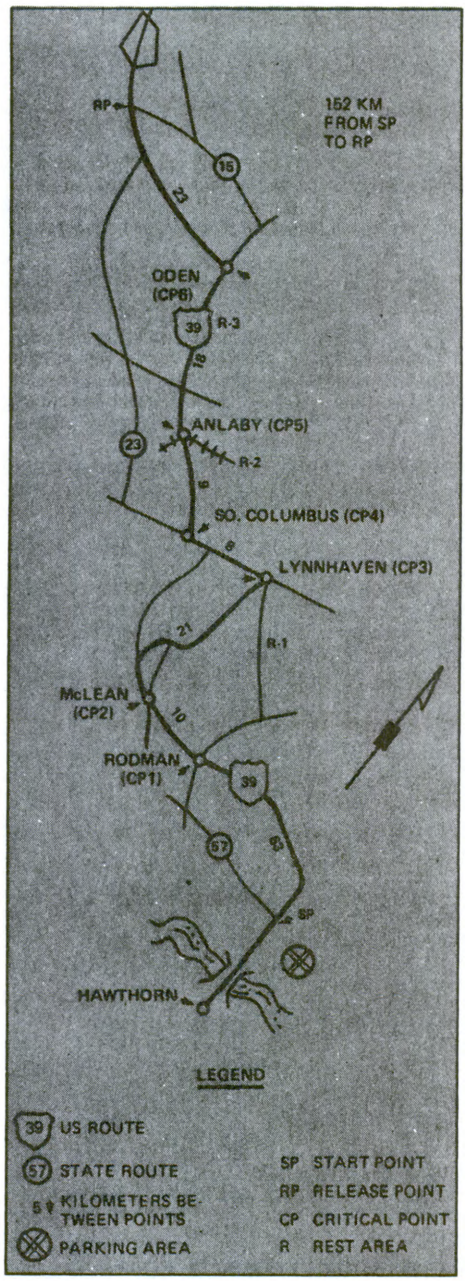
CHAPTER 4
MARCHES and MOVEMENTS



MOVEMENT ORDER

Sometime before the move, you will receive a movement order from battalion headquarters. As a rule, this order gives more details of the move than the warning order. Often it includes a strip map. The order gives such information as convoy organization, conduct of movement, start point, checkpoints, and bivouac, rest, halt, POL areas, and release point. At this time, you will need to brief your officers and NCOs again and choose members for the advance party.

ADVANCE PARTY

Your advance party should be made up of some soldiers from each element of your unit. The advance party probably will not have a radio, so some system must be worked out for keeping in contact. Road guides, visual signals, road markers, and messengers can be used. Duties (as necessary) of the advance party include:

- Clearing the route of obstacles and putting up road markers at appropriate locations.
- Clearing the new area of mines, booby traps, and trip-flares, setting up outposts; and securing the area; and checking for NBC contamination.
- Marking general areas for each element; laying communications wire from the command post to defense and operations areas; preparing field kitchen sumps and latrines.

Your company can move by motor, rail, air, or water transportation. On long moves, you may have to use a combination of means of transportation. However, for most short moves you will most likely use motor vehicles.

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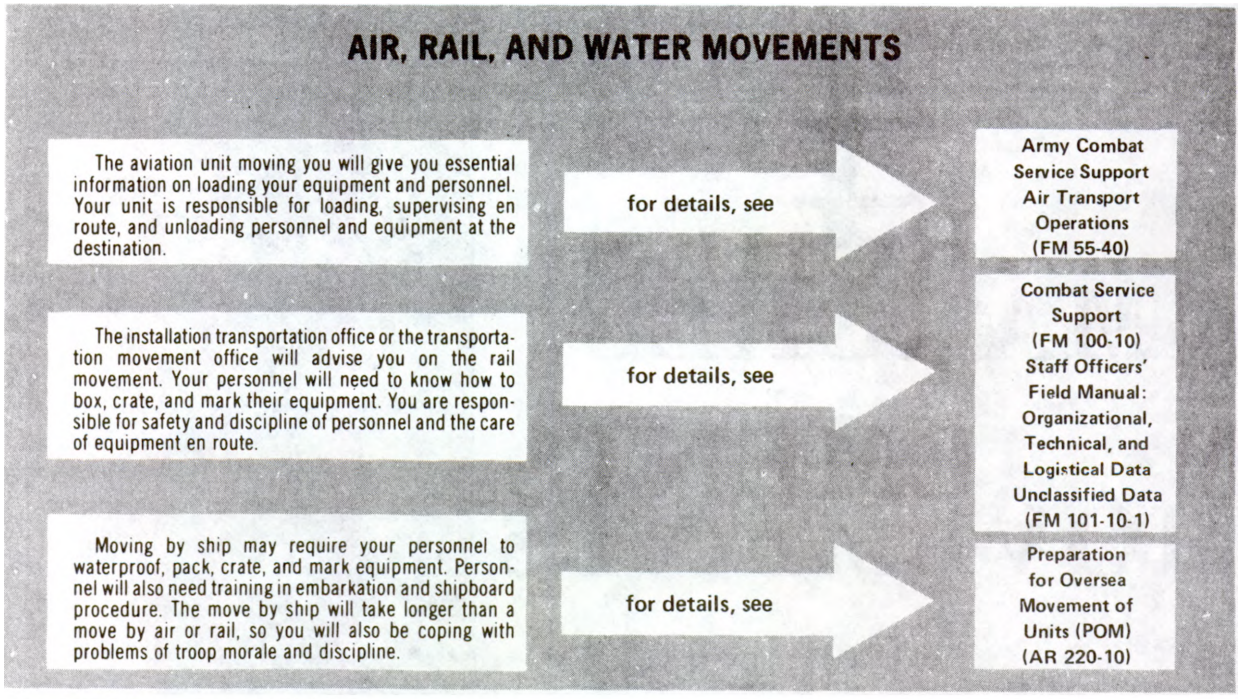
AIR, RAIL, AND WATER MOVEMENTS
The aviation unit moving you will give you essential information on loading your equipment and personnel. Your unit is responsible for loading, supervising en route, and unloading personnel and equipment at the destination.
for details, see
Army Combat Service Support Air Transport Operations (FM 55-40)
The installation transportation office or the transportation movement office will advise you on the rail movement. Your personnel will need to know how to box, crate, and mark their equipment. You are responsible for safety and discipline of personnel and the care of equipment en route.
for details, see
Combat Service Support (FM 100-10) Staff Officers' Field Manual: Organizational, Technical, and Logistical Data Unclassified Data (FM 101-10-1)
Moving by ship may require your personnel to waterproof, pack, crate, and mark equipment. Personnel will also need training in embarkation and shipboard procedure. The move by ship will take longer than a move by air or rail, so you will also be coping with problems of troop morale and discipline.
for details, see
Preparation for Oversea Movement of Units (POM) (AR 220-10)

MOTOR MOVEMENTS

Your company does not have enough organic vehicles to move all TOE and non-TOE equipment and supplies in one trip. You will need extra transportation. You can arrange this through the Field Services Officer in the Logistics Operations Branch of the Security, Plans, and Operations Section, Headquarters and Headquarters Company, Supply and Service Battalion.

No matter what type of transportation you use, your top priority is to get there ready to operate at the designated time. To do this as quickly and smoothly as possible requires careful advance planning and training.

LOADING PLANS

To help speed the move, you should have detailed plans for loading company personnel and equipment. These plans become part of the unit SOP. Loading plans are based on the type of transportation used (railcar, aircraft, ship, or truck); the number of soldiers to be moved; and the type, size, weight, and number of supplies and equipment to be moved. Each loading plan should include:

- Vehicle type and number of vehicles in convoy
- Section or platoon assignment
- Names of driver and assistant driver
- Number of passengers
- Equipment load in truck and trailer

You also need to plan how you will safeguard equipment and supplies to keep them from being stolen or broken while they are being moved. If possible, soldiers should be loaded on the same vehicle with their personal equipment. The driver of each vehicle is responsible for the correct loading of his vehicle. After the vehicles are loaded, you or a designated officer or NCO should inspect them and brief the drivers on operating procedures. If your company has no unit movement SOP, use FM 55-30 along with FM 25-2 to prepare your own.

DOCUMENTS

You need a complete convoy manifest listing all of your personnel and equipment. It gives the:

- vehicle bumper number by unit
- names of the drivers and assistant drivers
- names of passengers
- types of cargo

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Each platoon and section leader in the company prepares a manifest for his element. He does this when vehicles are in the assembly area so that any last minute changes can be shown. He gives it to you before the company leaves. Send a copy to battalion headquarters. The manifests will help you plan unloading operations at the new site. If there is an ambush or an accident, you can get from the manifest an accurate headcount, and you can use it to reorganize the march units.

ON THE MOVE

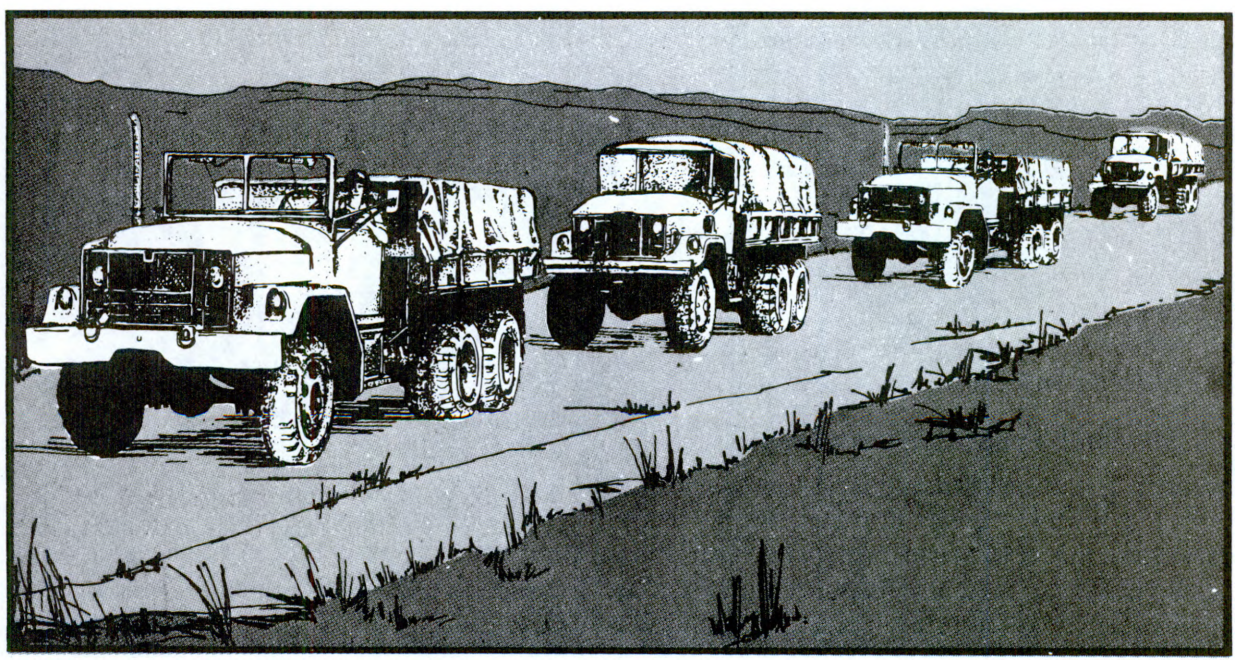
The time and route for your move are set by higher headquarters so that the vehicles in your unit will not conflict with other traffic on the route. You issue the operational orders which give the details for the march. You will probably want to brief the key operating personnel as well as your officers at this time. Here are some basic facts to cover in the orders for a motor march--

• ASSEMBLY AREA. This is the area where the convoy is formed and instructions given. Also, any other last minute details are worked out regarding the movement.

• START POINT. This is where the convoy groups leave your direct control and the movement begins. Assign each element a different time to cross the start point (SP) so as to prevent traffic tieups. Each element must be able to reach the SP without crossing the area of another element. Have an individual stationed at the start point to check the arrival of units and the march information. He should also have some means of communications for contacting company headquarters in the event of problems.

• FORMING THE COLUMN. Your headquarters element will be near the head of the column. Elements whose operating sites are most distant from the entrance at the new area should be near the front of the column. The slowest vehicles should also be near the front to set the rate of march. Your wrecker and maintenance vehicles should be at the end to help vehicles that break down.

• HALTS. Schedule your halts for 10 minutes every 2 hours. Pick sparsely populated areas with little traffic and as much cover as possible. Have halted vehicles keep the same intervals as those they used during the march. Halt where you have 180 meters (200 yards) of unobstructed vision with no curves or grades from each end of the convoy.



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• CHECKPOINT. Station personnel along the route to check speed and intervals of vehicles, condition of vehicles, and conduct of personnel. The number of checkpoints you need depends on the route.

• REFUELING. All vehicles carry full fuel cans so that they can be refueled during scheduled halts. For longer operations, personnel at headquarters make arrangements for refueling at Army refueling points or by 5,000-gallon tankers or tank and pump units.

• MAINTENANCE. Your drivers check the vehicles before leaving and do operator maintenance at halts. When the driver can't take care of the maintenance he drives the vehicle to the side of the road. The organizational maintenance people at the rear of the column then repair it. After it is repaired, the vehicle stays at the end of the column until the next halt. Then it returns to its place in the column.

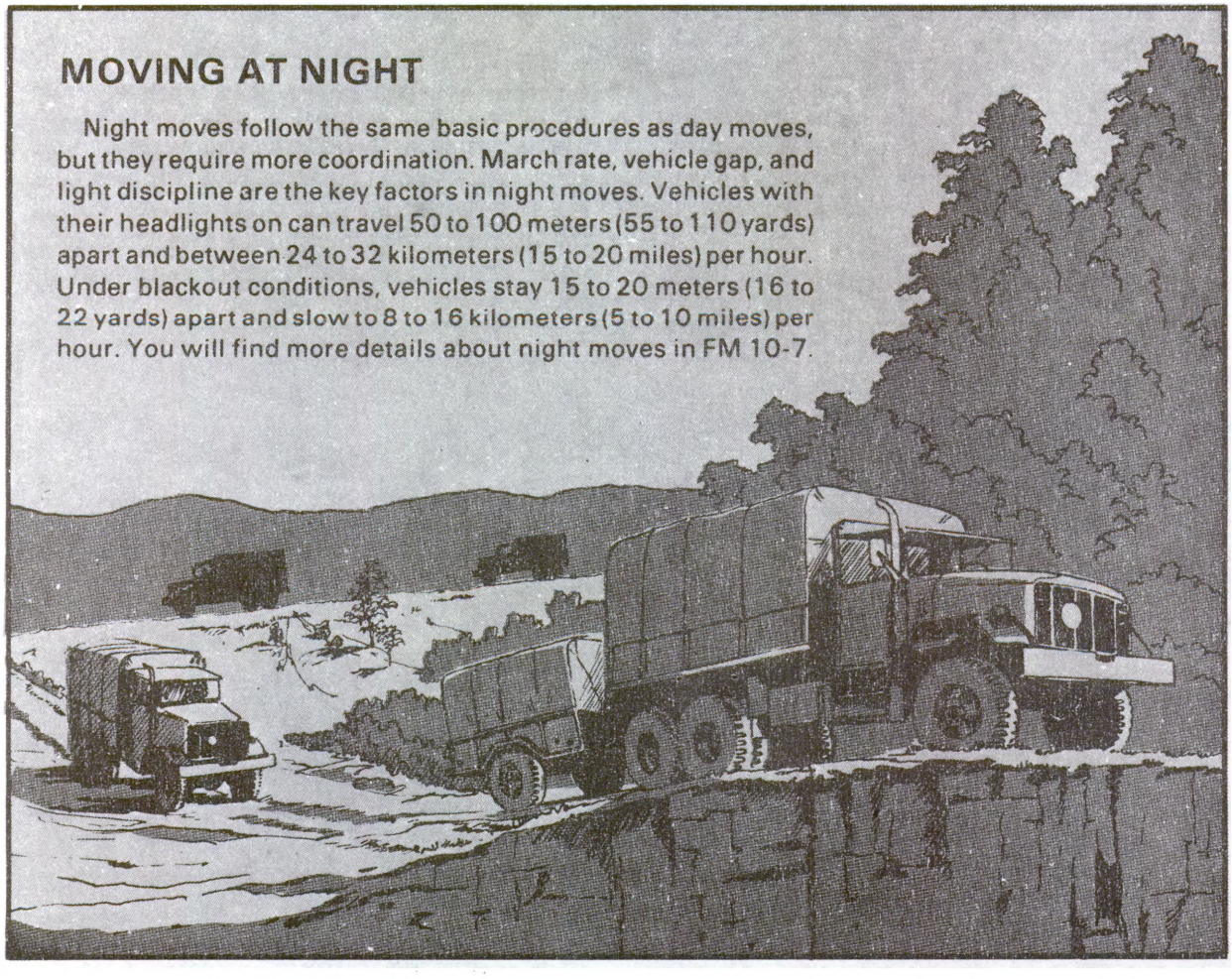
• MEALS. Your field kitchen issues MREs (meal, ready-to-eat) to each person when he gets his last hot meal before the march. On a long march, arrangements may be made for soldiers in your unit to eat with those in a unit located on the route.

• RELEASE POINT (RP). This is the point at the new area where your vehicles can leave the convoy and get to their new site. If your unit area is spread out, you may need more than one RP.

• REAR PARTY. Your rear party remains at the old area and closes out operations, doing such things as filling sumps and emplacements. The rear party keeps in touch with a higher headquarters (via radio) until your command post in the new area is operating.

MOVING AT NIGHT

Night moves follow the same basic procedures as day moves, but they require more coordination. March rate, vehicle gap, and light discipline are the key factors in night moves. Vehicles with their headlights on can travel 50 to 100 meters (55 to 110 yards) apart and between 24 to 32 kilometers (15 to 20 miles) per hour. Under blackout conditions, vehicles stay 15 to 20 meters (16 to 22 yards) apart and slow to 8 to 16 kilometers (5 to 10 miles) per hour. You will find more details about night moves in FM 10-7.



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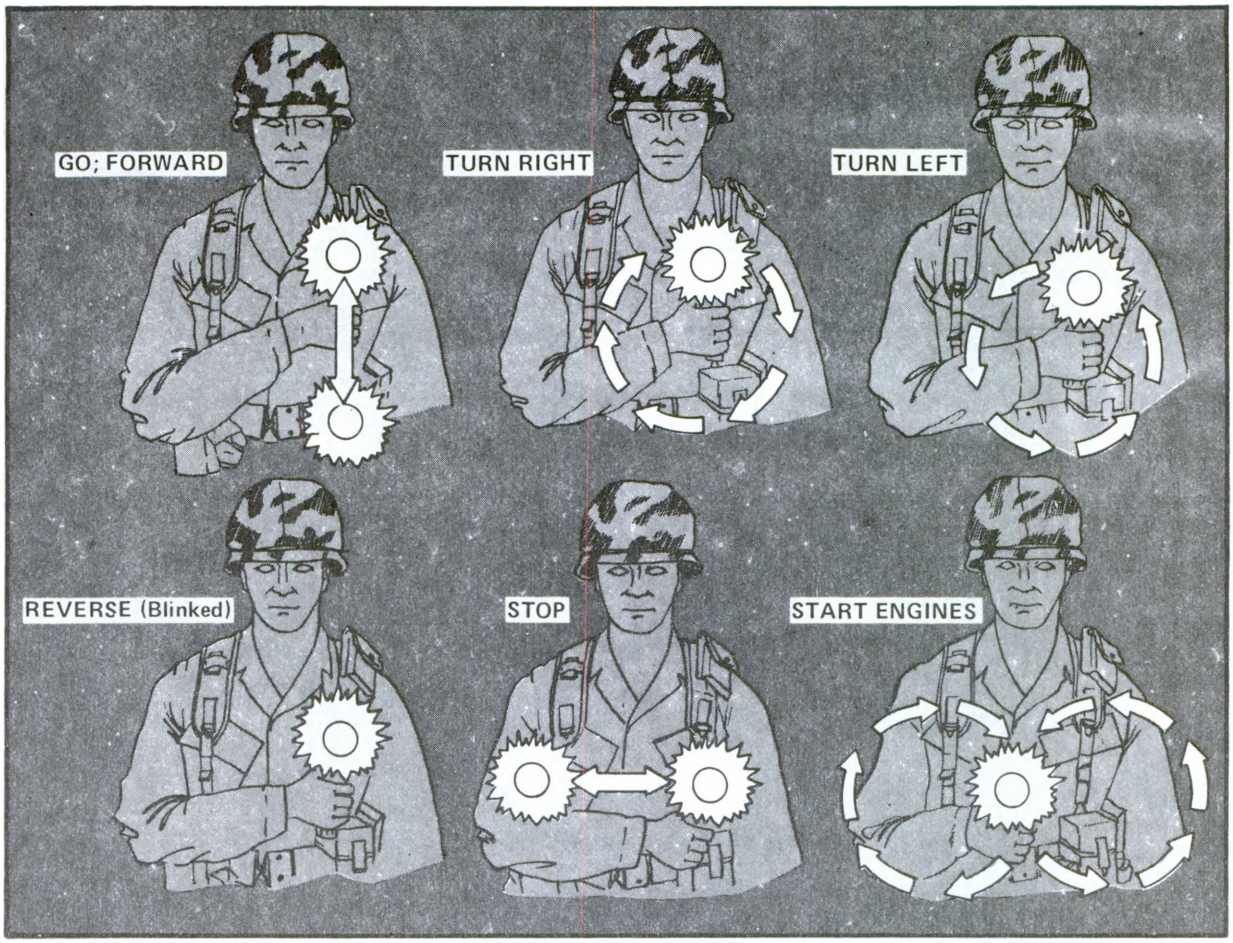

CHECKLIST

Have you included these in your planning?

- ☐ Site Reconnaissance
- ☐ Route Reconnaissance
- ☐ Advance Party
- ☐ Start Point
- ☐ Starting Time
- ☐ Arrival Time
- ☐ Critical Points
- ☐ Rate of March
- ☐ Loading Plans
- ☐ Unloading Plans
- ☐ Halts
- ☐ Refueling
- ☐ Feeding
- ☐ Road Guides
- ☐ Maintenance
- ☐ Defense Plans (ground and air)
- ☐ Visual Signals
- ☐ Road Markers
- ☐ Release Point

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ROUTE RECONNAISANCE CHECK LIST

1. Road conditions
2. By passes and detours
3. Type of terrain (steep, curvey, flat, swampy)
4. Bridge's capacity
5. Alternate routes
6. Security enroute
7. Locations of road guides
8. Start and release points
9. Critical points

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ROAD MOVEMENT CHECKLIST

1. Site Reconnaissance
2. Route Reconnaissance
3. Advance Party Composition and Orders
4. Start Point
5. Starting Time
6. Release Point
7. Arrival Time
8. Critical Points
9. Rate of March
10. Loading Plans
11. Unloading Plans
12. Halts
13. Refueling
14. Feeding
15. Road Guides
16. Maintenance
17. Defense Enroute (Ground and Air)
18. Visual Signals
19. Road Markers
20. Trail Party
21. Convoy/March Unit Composition

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ADVANCE PARTY CHECKLIST

1. Personnel:

   a. Road guides along march route (if needed)

   b. Guides at new location

   c. Local security at new location

2. Duties:

   a. Mark route

   b. Clear route of obstacles

   c. Clear new area of booby traps, mines, etc.

   d. Set up local security

   e. Mark areas for each subelement

   f. Start laying commo wire

   g. Guide subelements into new locations

   h. Find alternate site if necessary

3. Equipment:

   a. Radio - if available

   b. Ropes, chains, vehicle with winch (if available)

   c. Commo wire and field phones

   d. Engineer tape

   e. Mine detector(s)

   f. Radiac meters

   g. Chemical agent detectors/alarms

   h. At least two vehicles (one to stay put - another to meet convoy if commo doesn't work.)

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EXAMPLE OF UNIT

CONVOY PROCEDURES

1. Find out mission.

2. Identify Vehicles/Equipment

3. Convoy Clearance.

   A. DD Form 1265.
   B. 12 Day prior (min) to 330 Trans.
   C. Route given by COSCOM.

4. Special Hauling Permit.

   A. DD Form 1266.
   B. 17 Days prior (min) to 330 Trans.
   C. All 5 ton tractor trailer & larger.
   D. Must have copy of state(s) permit in vehicles.

VEHICLE PREPERATION

1. PM - Wheel Brng's
   Brakes
   Filters
   Lights
   U-Joints
   Charging Systems
   Belts/Hoses
   Front Drive Shafts (out)
   Transfer Pumps
   Tires

2. PLL - 5T Transfer Pumps.
   In Tank Pumps
   Extra Spare Tires (mounted)
   Hoses & Belts
   2½ T & 5T Jack Shafts
   Fuel, Oil, Air, Filters
   U-Joints
   Wind Shield Wipes/Motors

3. POL - Mogas (filler for M880)
   Diesel
   Brake Fluid
   GAA

   Oil
   10WT
   30WT
   90WT (w/pump Bucket)

Do not have all oil in 55 Gal drums. Qt cans are nice!!!

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PERSONNEL

1. Convoy Commander
2. Pace Setter (E-6 or Above)
3. Trail Officer (E-6 or Above)
4. Trail Maint Officer (E-6 or Above)
5. Driver & Asst For each Vehicle
   - A. Both must have Lic.
   - B. Asst may be E-6 & W/O Lic.
6. Advance Party (to ron site)

EQUIPMENT

1. Signs & Markers
   - A. Convoy Ahead
   - B. Convoy Follows
   - C. Convoy CDR
   - D. Oversized Vehicles
   - E. Flags (12"x18" 4 Front Side)
     1. Convoy CDR - white & black
     2. 1st Vehicle - Blue
     3. Last Vehicle - Green
     4. Explosive/Danger - Red
2. Strip Maps
   - A. Extra
   - B. Show Milage (rest/fuel)
   - C. List Emergency Phone #
3. OVE (include water cans)
4. Reflector Kits

LINE UP

1. Serial Lists & Signs
2. Appoint NCOIC
3. Start Early
4. Designate Guards
5. INSPECT!
   - A. Fuel
   - B. OVE
   - C. Safety Equipment
   - D. Dispatches
   - E. Trailers
     1. Brakes Released
     2. Air Hose Connections
6. Mark Convoy #

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MOVE OUT

1. Assemble 3hrs Prior (min)
2. Inspect
3. Brief Drivers
4. MCC Inspect
   A. Have contact team ready
5. Pass Out Strip Maps
6. Check Radios & Freq
7. Remind MP's
8. SP on Time

SAFETY

1. No Passing
2. No Stopping
3. Obey Civilian Laws
4. Stay on Route
5. Speed/Internal

MAX	50MPH	HWY	200M	RURAL	150M
MIN	45MPH	URBAN	50M		

6. Drive 10hrs in 24hrs (8hrs rest)
7. Rest 10 Min
   A. 1st hr
   B. Every 2hrs
8. DO NOT Pass Thru RON Site!!!
9. Disabled Vehicles
   A. Leave For Trail
   B. Record Bumper # & Mile Marker
10. Be Careful Pulling On & Off The Road (do not stand on road at haults)
11. Do Not Tailgate

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HINTS

1. Bring Your Own Fuel
2. Fuel Stops
3. A. Pull off Road Before Rest Area
   B. Move Into Rest Area in Small Groups
   C. Have Fuel Trks On Right - Diesel, Left - MOGAS
   D. After Fueling Assemble 1 Mile Down Road
   E. Trail OIC/NCOIC Report Refuel Completed
   F. Combine Chow w/ Fuel Stop
3. Issue "C" In AM
4. Do Not Plan on Hot Chow
5. Diesel Veh - if Charging System Fails Change Battery Box w/ Batteries
6. Get Civilian Road Maps
7. Have Room In One of Trail Veh's For Pax's in Towed Vehicles
8. As Many Tow Bars As Possible
9. Get List Of Dealers When You Get Credit Card (it may cost you)
10. Bring Compressor Belt Wrench
11. Extra Tires & Wheel (can. P[illegible])
12. Expect No Help From RON Site
13. Mech. Drivers Carry Tool Box
14. Put Mech's in 1st Serial
15. PMCS Before Supper
16. Drivers & Asst Have COT
17. TA-50 w/ Driver
18. Fly Extra People
19. Bobtails (5T & 2½ T)
20. Save Chow For Trail Party
21. Empty Fuel Cans On POL Truck (stops mess at refuel area)
22. WPNS Vehicle w/ CDR
23. No "Big MAC Attacks"
24. 3/4T TRL Spare Tires

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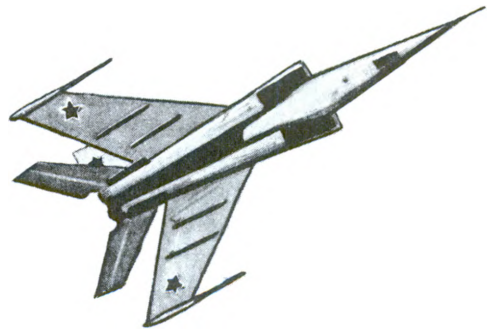
CHAPTER 5



DEFENSE of the COMPANY AREA

As commander, you are responsible for the security and defense of your company. You should prepare a plan based on guidance and instructions received from battalion headquarters and on the company's specific mission, situation, and location. Make sure company personnel are familiar with the plan; that each person knows his duties and specific responsibilities as outlined in the plan; and that all personnel know the correct procedures for dispersal, concealment, and camouflage. In the case of a guerrilla, an NBC, or an airborne attack, know what defensive measures to take; and assign specific duties to individuals as part of the unit defense plan. You should check your operations and then use all means at your disposal to make plans to lessen the effects of an attack so that the unit can continue to perform its mission. Coordinate your plans with those of adjacent units for a mutual defense plan. Your battalion headquarters is responsible for informing you of the tactical situation and the enemy's capabilities so that you can decide how to disperse the company's operations areas. You are responsible for informing battalion headquarters and adjacent units at once of attacks on your unit. Report the type and strength of the attack so that assistance, if available and required, may be provided.

DEFENSE PLAN

Make your unit defense plan flexible and all-inclusive because you cannot plan for every situation. The plan should provide for the strongest defense that can be made with the organic personnel you have. It should show individual responsibilities, and it should be simple, clear, and easy to understand. As a rule, one basic plan with alternate courses of action for meeting various types of attacks is best. Although the unit may be attacked by regular ground forces of the enemy, your main concern is defense against attack by airborne or airmobile forces or aircraft, missiles, and guerrillas.

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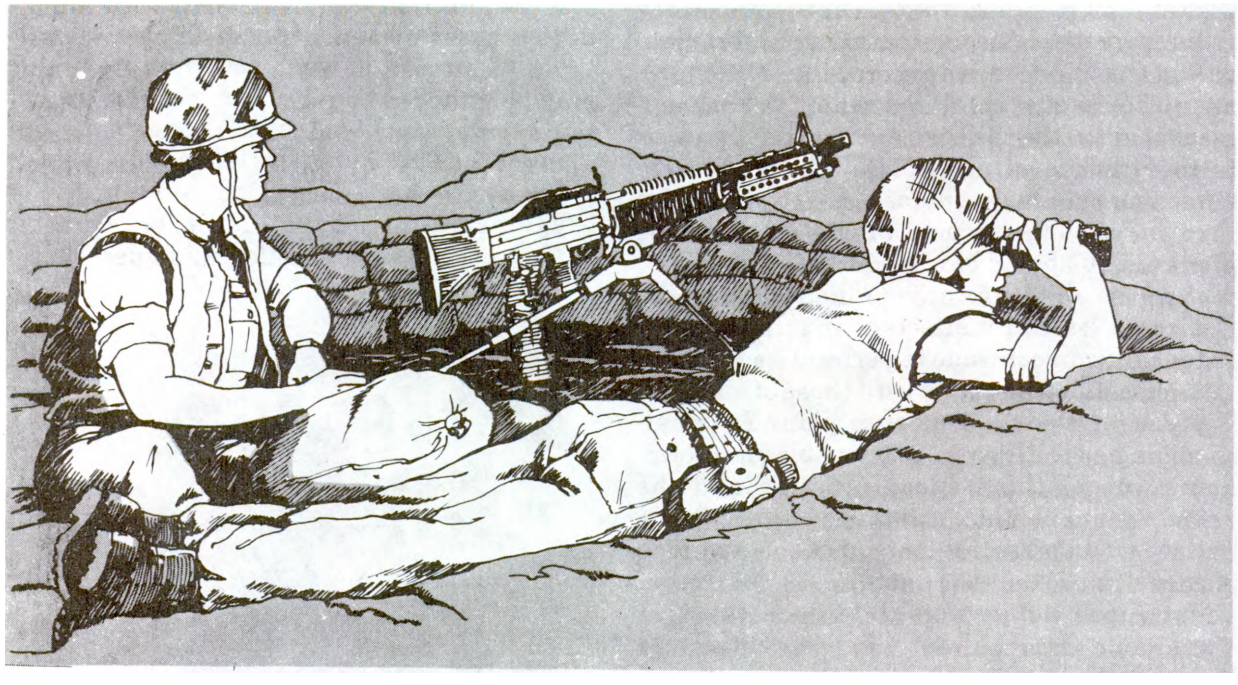
Passive Defense.

You should rely heavily on passive defense measures because you have only a limited number of arms and personnel. Camouflage, conceal, cover, and disperse unit operations. Use light and noise discipline, communications security, and alarm and warning systems. Good planning and preparation deny the enemy information about company operations. Thus, they reduce the chance of casualties and damage.

- The best defense against AIR ATTACK is to keep the enemy from seeing you by screening the company operating areas from view and dispersing facilities to keep down the chances of possible damage. Provide foxholes, bunkers, and fighting positions for the soldiers, and provide covered shelters for the command post and communications equipment. Use emplacements for machineguns and embankments for vehicles and other equipment to hide them from air attack. Study the terrain to find natural features such as caves, steep hills, and embankments. Manmade structures in good condition also provide shelter. Warnings of air attack will be broadcast over the air warning net which the unit monitors.

- Measures for defense against GROUND ATTACK include:
  - a warning system
  - assignment of sectors of defense to various company elements
  - personnel who are familiar with their assigned defense positions, duties, and responsiblities
  - fighting positions, foxholes, and bunkers
  - the assembly point for a mobile reserve, and that they know where it is
  - weapons emplaced to cover avenues of approach
  - camouflage discipline
  - coordination with adjacent units
  - a perimeter defense plan
  - frequent rehearsals and inspections of the defense system
  - plans for destroying equipment and supplies
  - firefighting crews
  - an evacuation plan for the wounded



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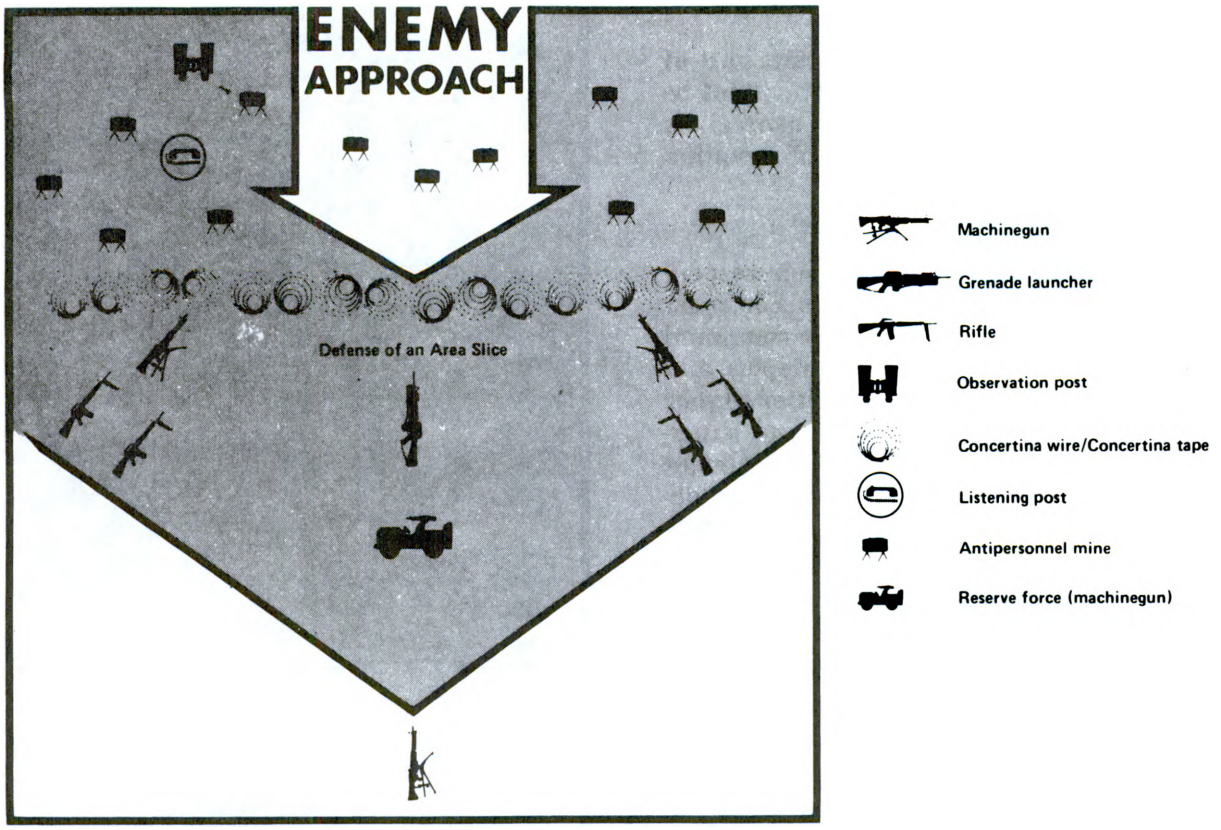

Active Defense.

Include in the defense plan for the company data on fields of fire, observation posts, listening posts, avenues of approach, and obstacles that can be used to slow down the enemy. Coordinate your plans with those of commanders of adjacent units to help insure mutual support and help.

Perimeter Defense.

A well-organized and effective perimeter defense will help protect the company against a surprise attack. Tell each soldier assigned to the perimeter defense his mission, zone of fire, and area of responsibility. The machineguns assigned to the company are emplaced along the perimeter of defense.

- The key to the defense of the company area is a good warning system. This system includes telephones, radios, observation posts, listening posts, trip flares, and patrols to control areas which could become enemy observation posts.
- Natural obstacles such as streams, swamps, ravines, cliffs, and dense woods near the perimeter defense line should be improved with such manmade obstacles as barbed wire, minefields, boobytraps, and roadblocks. Have as many of these obstacles as possible covered by small arms fire.

Rehearsal.

Rehearse your security and defense plans often so that your troops will become proficient in doing their assigned tasks quickly and well. Make the duties of key personnel clear to them, and cross train them so that if one of them is wounded, someone else can take over his duties. An effective defense plan, rehearsed often, may help keep down the chance of damage from enemy air or ground attack.

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CAMOUFLAGE

Camouflage is another important part of the company's defense plan that cannot be overlooked. The company must conceal its activities from potential enemy observation and surveillance.

Command.

Overall unit camouflage is your responsibility as company commander. You must insure that every soldier in your command understands the importance, principles, and techniques of camouflage. In addition to your responsibilities in the training and supervision of the indvidual soldier's concealment efforts, you must plan and execute camouflage measures for the operational, administrative, and logistical areas of your command. To insure the effectiveness of all camouflage measures, you are responsible for the strict enforcement of camouflage discipline.

Concealment.

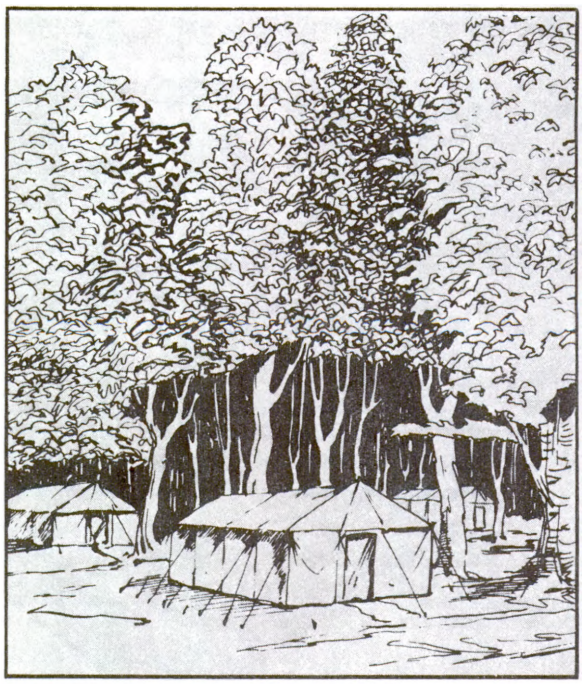
The majority of all concealment problems can be solved by proper siting. Natural terrain features such as edges of fields, fences, hedgerows, trees, embankments, dark areas of the terrain, and rural cultivation patterns are excellent sites to reduce the possibility of air observation. Regular geometric layouts are to be avoided. From the standpoint of ground observation, operational areas should be sited to avoid creating a silhouette against the sky or against a background of contrasting color.

Tracks.

Tracks, spoil, and debris are the most common signs of military activity which indicate concealed objects. Tracks should follow existing paths, roads, fences, or natural lines in the terrain pattern. This keeps operations inconspicuous from air observation. Also, tracks should always continue past a position to a logical termination.

Machineguns.

The machinegun receives the close attention of enemy troops and its concealment must be as perfect as possible. Usually, machinegun emplacements are hasty affairs. In this case, camouflage means siting to the best



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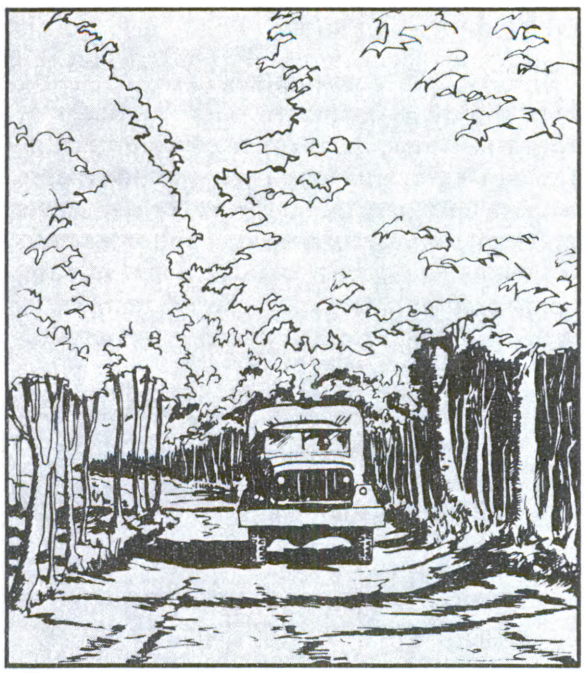

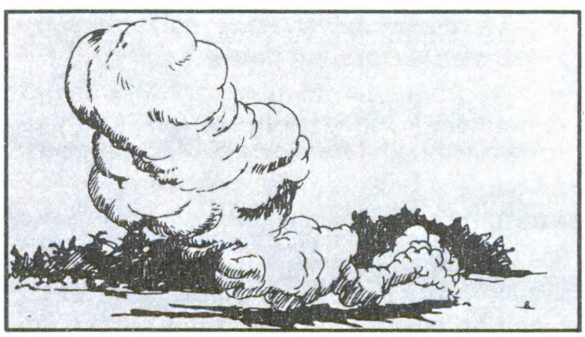

advantage and then improving the emplacements using any materials at hand.

Roads.

Partially concealed roads exist and are better than exposed ones. The reconnaissance party should locate them. Any gaps in overhead cover on such a road can be concealed by erecting overhead screens of either artificial or natural materials. On short stretches, exposed tracks may be erased by brushing leaves and debris over them. All concealed routes should be marked in advance of use and guards posted to insure minimum disturbance of the area.

Smoke.

The use of smoke as a tactic to camouflage operations from enemy observation and air attack is becoming increasingly more important. Its use will be determined by higher headquarters. In the event it is used, all personnel should be trained to work and operate under smoke conditions (i.e. reduced visibility).

Camouflage Screen System.

Your camouflage screen system: woodland, lightweight, radar scattering is a TOE item. Its importance to your overall camouflage effectiveness cannot be minimized. You and your personnel should become thoroughly familiar with its use, erection, and repair. Check TM 5-1080-200-10 for the details.

Drape Nets.

In addition to camouflage measures already mentioned, it may be necessary that these measures be augmented with the use of camouflage nets. CTA 50-909 authorizes them and TM 5-200 discusses their use.

Note. If drape nets are used, for example, to camouflage tents, personnel will find the job easier if they lay the nets over the tents, *before* they erect them. After tents are erected, camouflage nets can be easily arranged for concealment purposes.

Finally, as an overall command concern, the same standard of camouflage discipline must be adhered to by night as by day, including the use of light discipline.

For more information, see FM 5-20.

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NUCLEAR, BIOLOGICAL, CHEMICAL (NBC) DEFENSE

To be complete, the defense plan should provide for protection against NBC attack. Prepare the NBC plan as part of the unit plan or as an annex to it. To counteract or reduce the effects of an NBC attack, your plan should include the following:

- a company SOP for defense against an NBC attack;
- a flexible warning system which tells the type of attack;
- a description of the duties of fireguards and security guards;
- an outline for training all personnel in individual protective and first aid measures;
- information for contacting the Nuclear, Biological, Chemical Defense Company (TOE 3-87) for technical advice and help;
- information on how to use protective masks and special clothing and other protective measures;
- information on the use of protective shelters for personnel and equipment; and
- information on immunization and field sanitation procedures.

For more details, see FM 21-40, FM 21-41, and FM 21-48.

THREAT DOCTRINE

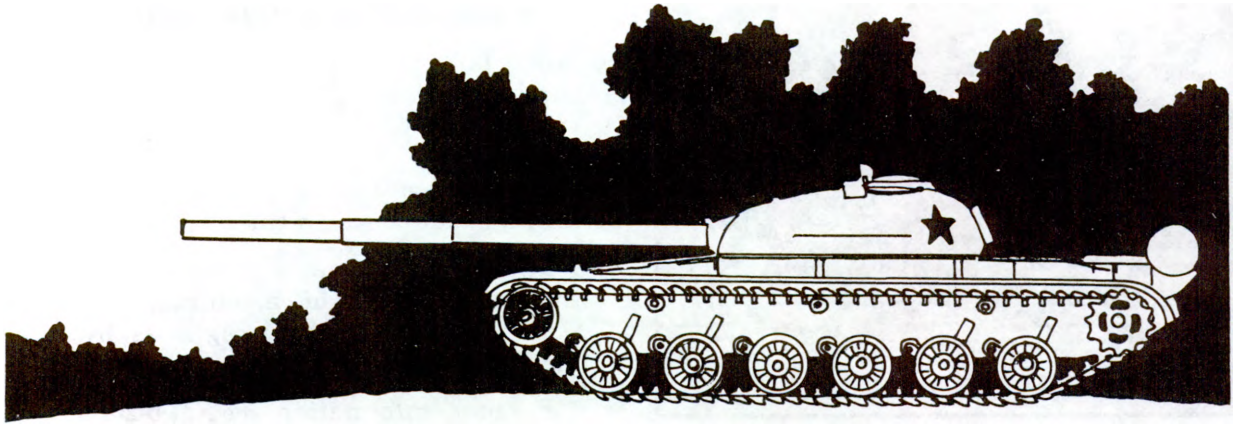
In the attack, commanders of the opposing force like to concentrate large numbers of troops and firepower for a combination of frontal attack, envelopments, and deep penetrations into rear areas by combined arms forces with heavy armor. They follow certain principles in support of a doctrine of fast-moving, offensive action. The principles of doctrine that can affect combat service support operations are as follows:

- Breach defenses at weak points and drive deep into rear areas.
- Use tactical air support for air strikes on support areas.
- Drop airborne forces into rear areas to create confusion and keep up the momentum of attacking ground forces.
- Use electronic warfare as a primary element of combat power.
- Conduct operations 24 hours a day under all visibility and NBC conditions.

Tanks.

Tanks may be used in both direct and indirect fire roles. They could have major impact on your unit's operations if they are able to penetrate the defenses during a breakthrough operation. This would allow them to drive into the corps rear and attack targets in the area.

If your unit is attacked by tanks and supporting motorized rifle companies during



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a breakthrough operation, you will need help to repel the attack. Your unit will have to use all its organic weapons to defend itself until rear area security forces are able to reach you and help you repel the attack.

Aircraft.

Your unit may be subjected to overflight by reconnaissance or observation aircraft. If their pilots see a tempting target, they will either attack or inform the commander of the tactical aircraft section of the location of the target. Depending on your location, your unit may also be attacked by attack helicopters.

Use the passive defense measures of camouflage, cover, and deception. FM 5-20 gives details on how to camouflage your activities. In addition to the use of passive defense measures, the active defense measure of small arms fire can be used successfully against low-flying aircraft. The corps SOP will state whether you can fire at aircraft. If the SOP allows your troops to fire at attacking aircraft, you must brief all personnel on how to recognize aircraft, and you must teach them correct lead and engagement techniques. Information on aircraft defense techniques is in TC 23-44 and TC 44-30.

Artillery.

Enemy forces mass artillery at all tactical echelons. This artillery support saturates the area with massive barrages. A massive barrage is a severe and intense bombardment by multiple artillery weapons. It is designed to bring about defeat with a minimal use of motorized rifle or tank troops. Direct fire is used on prime targets such as your location,

and it is used to support an armored and motorized attack. Heavy artillery, such as the 130-mm and 180-mm field guns, is able to hit targets 25,000 meters (27,500 yards) deep within the division.

If your unit receives incoming rounds from medium to heavy artillery of the opposing force, you, as commander, must request permission to move the unit to a new location. Until you receive permission to move, you can take only passive measures. All personnel should move into their protective shelters and wait until the barrage stops.

Infiltrating Parties and Main Bodies of Enemy Troops.

Enemy troops may be used in large or small scale operations in the corps rear.

Battalion size groups or larger groups can be airdropped up to 320 kilometers (200 miles) in front of the enemy advance. The larger forces, equipped with armored vehicles, are used to speed up the movement of ground forces. They seize bridges and fords, capture airfields, and carry out sabotage missions against facilities for launching nuclear missiles and communications facilities. Operating in the corps rear, they may also divert the movement of reserve forces from the main battle zone and generally disrupt the corps offensive and defensive capability. If your unit encounters this type of force, you will need assistance from rear area security forces to defeat it. Requests should be sent immediately to higher headquarters. Your response to a battalion-size or larger group should be to withdraw from immediate contact, if possible.

Small airborne reconnaissance units may be dropped in the corps rear where they may work with local partisan groups to gather intelligence data. Small units may be dropped also for sabotage or other special missions. Attacks from infiltrating parties or guerrillas usually take place at night. If possible, repel this threat with M16 rifles and grenades, and do not use the machineguns. In this way, you don't reveal the positions of the machineguns.

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Radioelectronic Combat.

Threat forces may be expected to attempt systematically to analyze US Army communication emitters and jamming devices. They may then attempt to destroy or disrupt at least 50 percent of the corps command, control, and weapon system communications wherever they can by the use of suppressive fire or electronic jamming.

Keep the use of your radio to a minimum. When your radio operator uses it, he should follow Communications-Electronics Operation Instructions (CEOI) and practice communications security. Be prepared to rely on wire communications and messengers to send information. (Also see pages 2-9 and 2-10 of this manual: Electronic Warfare.)

REAR AREA PROTECTION

Rear area protection (RAP) is a command responsibility and includes those measures taken to protect the resources of the command from interruptions caused by sabotage, enemy activity, or natural disaster. The purpose of RAP is to make the best use of the strength of units in the rear area to prevent interruption of operations.

RAP is divided into the two functions of rear area combat operations (RACO) and area damage control (ADC). RACO includes those defensive measures taken to reduce the effects of enemy activity including both infiltration and sabotage and also attack by enemy action. Area damage control includes those steps taken before, during, or after enemy action or natural disaster. Its purpose is to reduce the probability of damage, minimize the effects of damage and to speed up recovery and renewal of the primary mission of providing support.

Normally, the Company will be assigned by higher headquarters to an installation or cluster of units in the rear area. Several units are normally grouped in bases, or "clustered," during wartime to help provide mutual defense; a single company-sized element operating by itself would waste personnel by having too many devoted to self-defense rather than performing the support mission. Within the base or cluster of units, the senior commander is responsible for the defense of all units in that group. He will usually establish a base defense operations center (BDOC) to coordinate the efforts of all of the units. The field service company participates in the RAP operations for the base as directed by the base commander. The company will be required to help plan and participate in damage control operations both on the base and in the vicinity of the base. An example of an ADC mission would be the company providing a platoon to help clear a nearby road intersection blocked by rubble. The company participates in base self-defense as directed by the base commander. Usually each company (or other size element) is given a specific sector of the base to defend. The sector will include a portion of the perimeter defenses and also a part of the inside of the base. The company commander plans for the defense of his sector and submits his plans to the DBOC for approval. The field service company should also be prepared to assemble and deploy a platoon or the entire company to go to the assistance of another friendly unit which is under attack.

The unit defense plans include an area damage control plan to keep casualties and damage as low as possible. During an attack or disaster, you must give thought first to surviving and helping the injured. Next, treat and evacuate any casualties and assess and repair what damage is necessary to start operations again. In the case of an NBC attack, take necessary protective steps, report the type and extent of damage to the BDOC, and continue the mission.

DEMOLITION

Demolition is a command responsibility. It is usually done on orders from higher headquarters as a last resort. Prepare a simple plan for the rapid and thorough destruction of equipment, supplies, records, and structures. Make sure that all equipment and supplies that might be captured by the enemy will be of no use to them. Include in this plan priorities for demolition and methods of destruction. AR 380-5 and FM 5-25 give you more details.

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CHAPTER 6 NONDIVISIONAL MAINTENANCE UNIT NOT COLLOCATED WITH OTHER UNITS

AREA SELECTION AND ORGANIZATION.

a. A nondivisional maintenance unit may have to defend a perimeter by itself. This situation could come about by combat requirements, supply and maintenance requirements, or a situation such as nuclear warfare which would require maximum dispersion between companies. These situations will require more detailed planning and will be the most difficult to organize and conduct. Thus, maintenance units should always strive to be collocated with one or more of the supported units. In a situation where a nondivisional unit will have to defend itself, area selection and layout will be the most critical factor with which the company commander must concern himself. The area must minimize the requirement for heavy traffic and provide for ease of control of the unit. However, the area must also permit all-round defense. The extent of the area required to house the company will depend upon the enemy situation and the amount of equipment in the company area from supported units. This area may be as large as three square kilometers or smaller than one square kilometer. The smaller the area occupied, the easier it is to defend.

b. A nondivisional maintenance unit in a combat environment organized to conduct efficient maintenance operations is laid out in a manner similar to that shown in figure 1.

c. In order for the perimeter defense to be completely effective, it must be well-coordinated and controlled, and this requires reliable communication systems. In addition, the unit must utilize all available weapons and supporting equipment. The nondivisional maintenance unit may have the following weapons and other equipment available depending upon the TOE or MTOE under which it operates.

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Weapon	Qty	Equipment	Qty
Bayonet	215-240	Radio set, AN/VRC-46	2
Launcher, grenade, M203	17	Switchboard, SB-22	1
Machinegun, 7.62mm	6-9	Telephone set, TA-312	13
Pistol, cal .45	1	Truck, cargo, 3/4-ton	1
Rifle, 5.56mm	214	Truck, cargo, 2-1/2-ton	6
Machinegun, cal .50*	2	Truck, utility, 1/4-ton	4

*WABTOC - When authorized by the oversea commander.

This is the primary equipment available to the unit for security. This equipment will be employed as necessary to insure the coordination and control of the defensive effort. In addition to the weapons and equipment listed above, each unit would employ Claymore mines and light antitank weapons (LAW) in the defense of the unit perimeter. The LAW, M72, is authorized on a one-for-one direct exchange, based upon the rounds allocated to the 3.5-in rocket launcher. The 3.5-in rocket launcher was never authorized for this type of maintenance company and, like the Claymore mines, would have to be authorized by the theater commander as a WABTOC* item. Both the mines and the light antitank weapons would have to be transported and stored by the company supply section when the items were not being employed in the defense of the perimeter. In an emergency, operable job-ordered equipment will be sited and utilized to increase the defensive capability of the maintenance unit.

d. Utilizing the nondivisional maintenance company ideal setup for field operations, the recommended organization of the perimeter defense could be as depicted in figure 2.

e. The company commander has many considerations when organizing his company for defense of the perimeter. The most important consideration is the mission. Of almost equal importance is the posed enemy threat. The threat is extremely important as it will have a direct bearing upon the dispersion of the maintenance company when setting up in the field location. Nuclear warfare dictates maximum dispersion, while guerrilla activity of a low-key nature will require the company to close in and tighten up its perimeter. In addition to these considerations, the company commander should know:

(1) The location, composition, and capability of the nearest friendly units and maintain close communications with them and adjacent units.

(2) The type of forces and the reaction time required for outside resources to move in and assist the maintenance company with its defense.

(3) The artillery units available for preplanned and on-call artillery fires, to include communications methods.

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FIGURE I

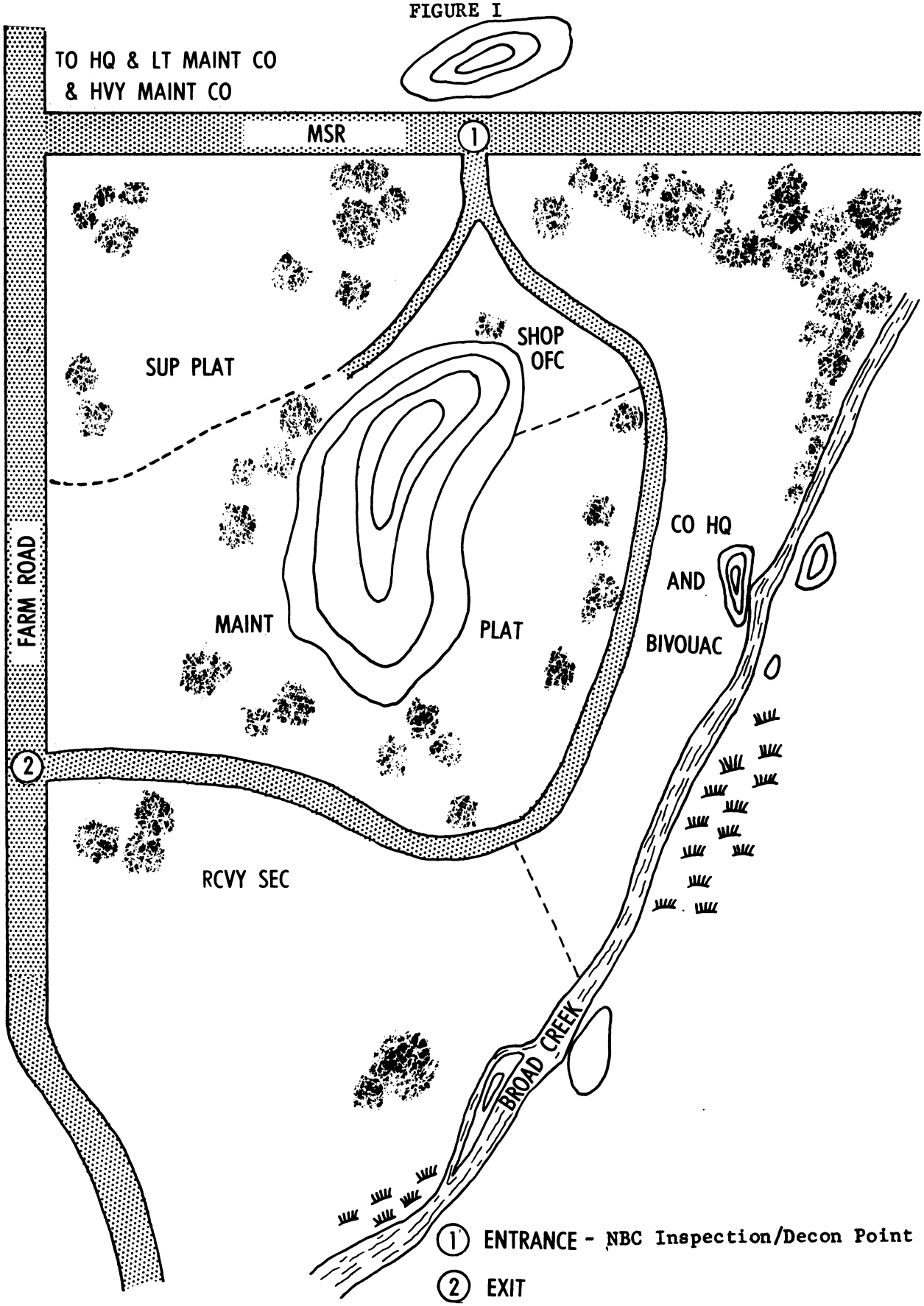

Figure 1a Type layout, forward support company.

MAP - SKETCH A

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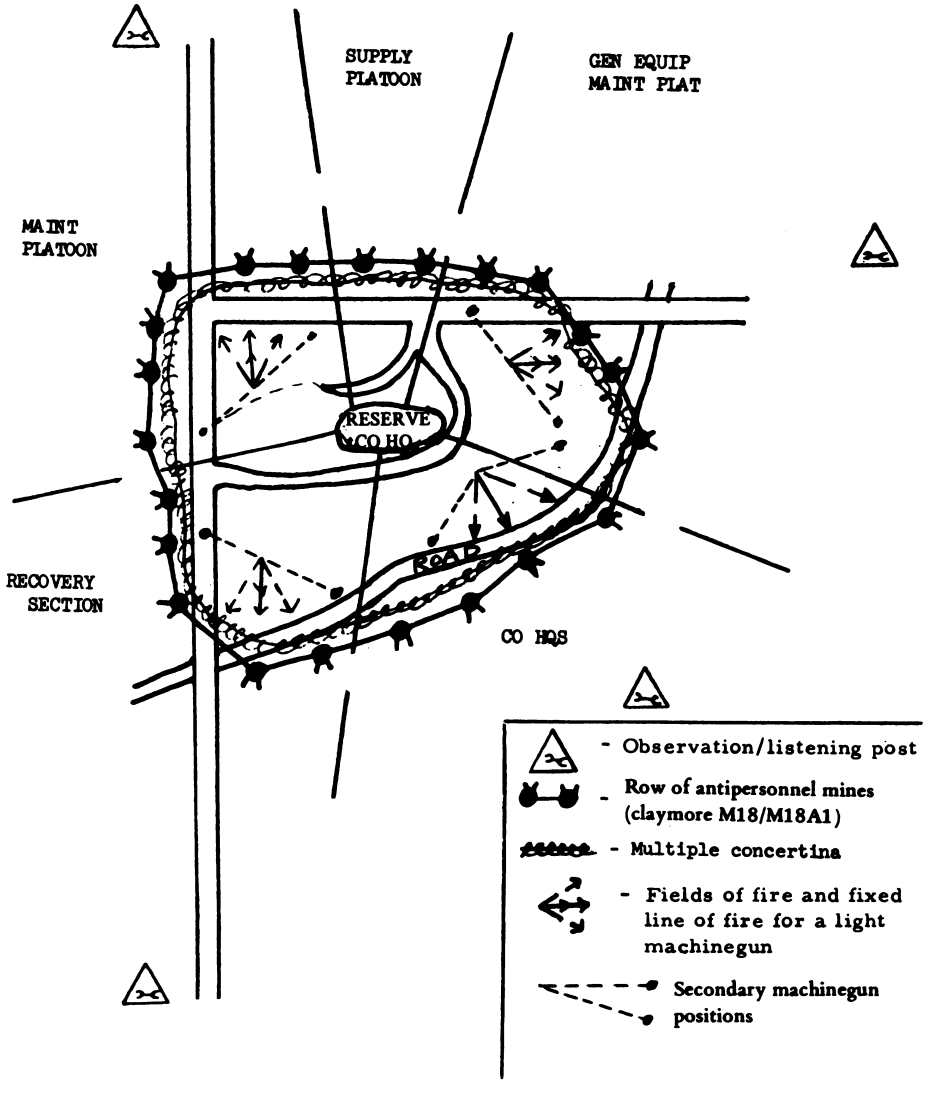

Note. - The two additional machineguns are located in the reserve area for added firepower. Machineguns are positioned to provide interlocking fires and mutual support.

Figure 2. Sketch map B.

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(4) Aviation support available for perimeter reconnaissance at first and last light, and the availability of close air support (both Army and Air Force).

(5) The latest information available on the enemy's capabilities.

This information will assist the company commander in determining the amount and type of defenses he will require to defend his perimeter. Defense requirements will vary depending on the time of day and the weather conditions. As a minimum, during normal daytime conditions, observation posts and machineguns within the perimeter should be manned. The machineguns are emplaced to cover the most likely enemy avenues of approach. Weather conditions and terrain restrictions which reduce visibility may require additional measures such as daylight patrols. These minimum requirements should not degrade the maintenance effort to an appreciable degree. As the enemy threat increases, the requirements for the defense effort will also increase.

CHAPTER 7 NONDIVISIONAL MAINTENANCE UNIT IN SUPPORT OF A CAVALRY REGIMENT LOCATED IN THE REGIMENTAL TRAINS AREA

COMBAT SERVICE SUPPORT AND AREA SECURITY.

a. The armored cavalry regiment will receive required support from corps combat support units (CS) and COSCOM combat service support units (CSS). This support may include the following units or elements thereof:

(1) Engineer water purification team (corps).

(2) Signal direct support detachment (corps).

(3) Medical company, with ground and aeromedical evacuation units (corps).

(4) Direct support maintenance units (COSCOM).

(5) Army postal unit (corps).

(6) Quartermaster bath and clothing exchange team (COSCOM).

(7) Quartermaster graves registration team (COSCOM).

(8) Direct support aircraft maintenance company (COSCOM).

(9) Transportation light truck company (COSCOM).

(10) Transportation heavy truck company (COSCOM).

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(11) Mobile supply points (COSCOM).

(12) Military police platoon (corps).

(13) Civil affairs teams (corps).

(14) Psychological operations teams (corps).

When the above listed units/detachments are provided to the regiment, they will normally operate from the regimental combat service support area. In addition to these elements, the field trains of subordinate and attached units operate from the regimental trains area. To provide control for these units, the regimental S4 establishes and maintains a combat service support operations center called the Regimental Logistical Control Point (RLCP). In addition to being the focal point of regimental combat service support operations, the operations center also coordinates the security of all units/elements located in the trains area. All of the units/detachments listed above will have the capability to provide for local security; however, in providing for security of the entire area, the RLCP will establish sectors of responsibility for those units capable of providing that security. The company-size elements listed above will have the primary responsibility for security of the area. Actually, the direct support maintenance company and the medical company will probably be the only two company-size units in the regimental trains area. The transportation aircraft maintenance company will be collocated with the air cavalry troop in another location. The direct support maintenance company will be required to send out contact teams to support the three squadrons when they begin operating over extended distances. COSCOM units may also be organized into a forward area support coordination team (FASCT) with its own commander and coordinating staff in order to enhance coordination for the defense.

b. The regimental combat service support area would be laid out as depicted in figure 3.

c. The regimental S4 assigns areas of responsibility for security to the units/elements occupying the perimeter. In this case, the maintenance company will no longer be responsible for the entire perimeter. In the situation depicted in figure 3, the organization for perimeter defense would be similar to that shown in figure 4.

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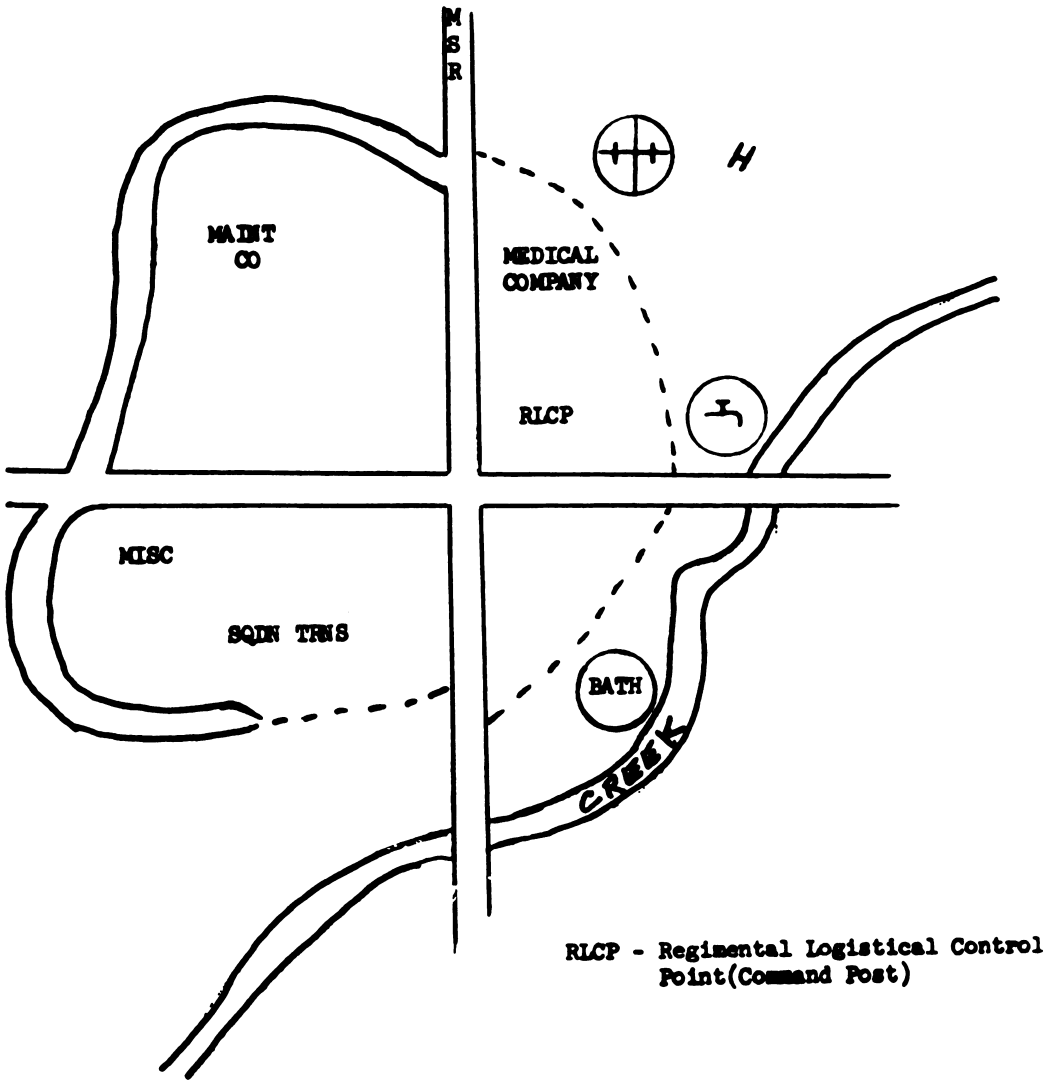

Figure 3. Sketch map C.

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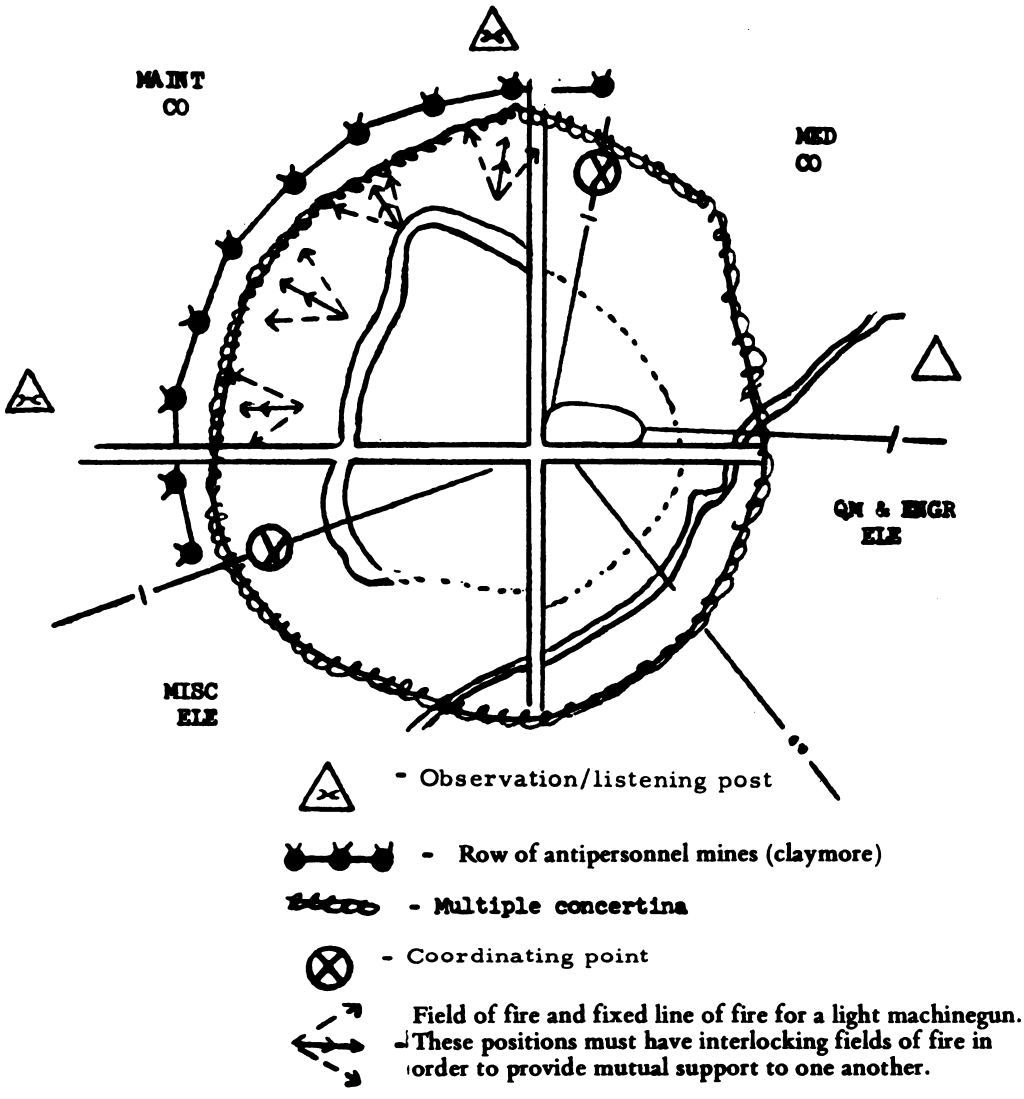

Figure 4. Sketch map D.

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d. The regimental S4 will assign the largest portion of the perimeter to the maintenance company, because the maintenance company has the greatest capability for defense compared to the units/detachments occupying the regimental trains area. The defense requirements for the company will be similar to a non-divisional maintenance company not collocated with other units. The company will still be required to establish an effective defense in its assigned sector. OP/LP, reserves, concertina wire, antipersonnel mines, fields of fire for light machineguns, and patrols will still be required, and will be planned for, organized, and conducted as recommended for the nondivisional maintenance company defending its entire perimeter. The primary differences between the maintenance company not collocated with other units and the maintenance company in the regimental trains area are the requirements for coordinating the defense and the amount of effort that will have to be expended for the defense. The maintenance company commander of a unit defending its entire perimeter will have to coordinate artillery and air support, locations and reaction times of friendly units, and enemy information. For the maintenance company in the regimental trains area, this coordination will be made by the RLCC and disseminated to all units/detachments occupying the trains area. Equipment and manpower requirements will be less, but the reserve for the entire area will probably be provided by the maintenance company. This reserve will be centrally located and controlled and employed by the regimental S4.

e. An advantage of the nondivisional maintenance company located in the regimental trains area is the possibility that a cavalry troop will be provided by the regiment to assist with or provide security for the perimeter. When all regimental squadrons are committed to a mission, the regimental commander will normally place the tank company in each squadron in reserve. This means that the tank company cannot be committed without the approval of the regimental commander. One or more of these tank companies may be relocated to provide security to the regimental commander only when there is no possibility of the primary mission being adversely affected. It is, therefore, essential that maintenance units be capable of organizing and manning a defense perimeter, as well as being able to provide required security in the form of OP/LP and patrols.

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CHAPTER 8 DIVISIONAL MAINTENANCE UNIT IN SUPPORT OF A DIVISIONAL BRIGADE IN THE BRIGADE TRAINS AREA

COMBAT SERVICE SUPPORT AND AREA SECURITY.

a. A divisional forward support company is normally collocated with the other units/detachments in each of the three brigade trains areas. The forward support company employs contact teams forward to the combat battalions to repair equipment that can quickly and easily be returned to an operational condition. On-site maintenance is performed whenever possible to eliminate time required to evacuate equipment to the brigade combat service support area.

b. The divisional forward support company (like the non-divisional maintenance company) has limited types and amounts of equipment and weapons available for defense. The weapons and equipment available are as follows:

Weapon	Qty	Equipment	Qty
Bayonet	168-245	Radio set, AN/VRC-46	1-2
Launcher, grenade, M203	5-15	Radio set, AN/VRC-47	1
Machinegun, 7.62mm	3-4	Recovery vehicle, M88A1	1-2
Pistol, cal .45	3-7		
Rifle, 5.56mm	165		
Machinegun, cal .50*	1-2		

*This machinegun is a part of the Basic Issue List Items (BILI) for the M88A1 recovery vehicle.

This is the primary equipment available to the forward support company for unit security. The above list was extracted from TOE 29-37H, which is the TOE of an armored division's forward support company and is typical of divisional forward support companies. There are minor differences in authorizations for personnel and equipment. The recovery vehicle is a major asset of this unit and it can be used to clear lanes of fire for automatic and semiautomatic weapons and, because of its armored protection, can be employed as part of the perimeter defense.

c. The forward support company in support of a divisional brigade is collocated with other brigade trains elements. The units/detachments normally found in the brigade trains area are:

(1) Forward support company.

(2) All classes of supply except class V (mobile detachments).

(3) Medical company.

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(4) Graves registration team.

(5) Quartermaster bath facilities.

(6) Elements of the aircraft maintenance company.

When these units/detachments are provided to the brigade, they will operate from the brigade trains area. In addition to these elements, the field trains of subordinate and attached units will operate from the brigade trains area. The strength and composition of the DISCOM units operating in the brigade trains area vary as necessary to support the brigade and attached units. The DISCOM also provides a forward area support coordinating officer (FASCO) with the authority to act for the DISCOM commander. The FASCO coordinates supply and services based on priorities established by the brigade commander. He maintains close liaison with battalion task forces S4s and operates in the brigade and divisional logistical nets. The brigade S4 coordinates brigade requirements with the FASCO and establishes staff responsibility for combat service support and security and displacement of the brigade trains. The brigade S4 is also charged with the responsibility for coordinating and organizing the security of the brigade trains area. The brigade S4 will task units operating in the brigade trains area for the security measures needed for that area. The maintenance company has the greatest capability for self-protection and will be given the largest and/or most vulnerable sector of the perimeter. The security requirements for this company will be the same as all other maintenance companies; i.e., OP/LP, patrols, concertina wire, antipersonnel mines, and fields of fire for light machineguns. The brigade S4 will determine the enemy threat, capabilities, and likely employment. He will also coordinate artillery and air support, reinforcements, etc. The typical defensive layout for the brigade trains area is similar to that depicted for the regiment in figure 4.

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APPENDIX A

UNIT SECURITY/BASE DEFENSE

1. GENERAL. This appendix will point out the factors that make maintenance units more vulnerable than combat units to enemy attack. It will also enumerate some of the principles of defense that the maintenance company commander will have to address to assure a successful defense. Finally, it describes the requirements that the unit has in relation to other CSS units operating in rear areas.

2. COMBAT SERVICE SUPPORT VULNERABILITY. There are several factors that make combat service support units (CSS), especially maintenance units, vulnerable to enemy attack even though they are not located on the front lines.

a. Maintenance units are located in areas that enhance accessibility for the customer. This same accessibility invites attack from the enemy.

b. The primary mission and training focus of maintenance units is not combat-oriented. The amount of training time available for combat training of individuals and the unit is minimal. Lack of combat proficiency makes the unit vulnerable to enemy attack.

c. By TOE, there are few crew-served weapons and little antitank capability in relation to the number of personnel in the unit.

d. There are severe limitations on the types and amounts of supporting firepower because the priorities of these systems will be directed to maneuver units.

e. The size of the unit area and requirements for continuous operations increase problems of defeating the enemy's attempts to locate the unit.

f. Maintenance units require substantial amounts of time to relocate. This causes problems if the unit is attacked and is forced to displace.

g. Mission requirements prevent manning of all defensive positions continuously. Relatively few units are available to assist the maintenance unit in providing security for the rear area.

h. Threat force doctrine calls for elite combat units and airborne forces to disrupt our lines of communication as preparation for offensive operations.

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3. PRINCIPLES OF DEFENSE. While the vulnerability of maintenance units is high, there are ways to minimize it as well.

a. Proper Use of Terrain. No single principle can have the impact that terrain does on a successful defense. The ability of the defender to exploit the terrain fully gives him a decided advantage over the attacker.

b. Security. The best defense can be overwhelmed if the attacker gains the element of surprise. Maintenance units are particularly vulnerable because of the amount of noise, light, heat, and dust that is generated during normal operations. By placing increased emphasis on security, the unit can gain needed reaction time to enable everyone to reach their defensive positions and begin to repel an assault.

c. All-round Defense. The maintenance unit will usually be located in a rear area. Rarely will there be sufficient combat units to provide security for the entire area. Therefore, the enemy can attack from any direction at any time. The unit must defend itself from any direction.

d. Integration and Coordination of Defensive Measures. Every available means should be employed in defense of the unit. The maintenance company commander should be constantly coordinating for additional resources to defend his unit.

e. Defense in Depth. The deeper an enemy has to attack, the less chance he has to succeed. Mounted avenues of approach, in particular, are covered in depth to insure the enemy attack is halted before the unit is overrun.

f. Mutual Support. All positions within the unit and adjacent units should be located where they can cover each other with fire to prevent the enemy from bringing overwhelming combat power against just one position or one unit.

g. Responsiveness. The company should be flexible enough in its defense and normal operations to react quickly to an enemy attack. It must also be ready to modify its defenses as the enemy and friendly situations change.

h. Dispersion. Spreading all parts of the unit out reduces the chances of the enemy attacking by air or with artillery; however, spreading the unit out too far increases its vulnerability to ground attack.

i. Maximum Use of Offensive Action. Commanders should seek ways to disrupt the enemy's plan of attack. For example, an enemy force is seen by an OP. The commander should engage the unit with artillery or other means as soon as possible rather than waiting for the enemy to attack his position.

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j. Use of Available Time. The commander must plan ahead to insure that his unit can thoroughly complete its defensive preparations before mission requirements reduce his available manpower. Unit defense is not an afterthought; it is integrated into all of the unit's activities.

4. UNIT/BASE DEFENSE. Responsibility of overall rear area tactical defense and operations, as well as defense against large enemy attacks, belongs to the area commander. The unit/base commander is responsible for his own local and internal security to protect against infiltration and small-scale attacks. The unit defense plan is coordinated with, and becomes part of, the area defense plan. The unit defense plan will define the areas which the unit is responsible for defending. These areas are:

a. Base Area. This is the physical location of the unit; the base area is the space enclosed within the perimeter.

b. Forward Defense Area. Extending from the base to the range of the enemy's most common indirect fire weapon, the forward defense area requires the company to maintain OPs, patrols, and other active defensive measures to eliminate enemy threats.

c. Reconnaissance and Surveillance Area. Extends far enough from the forward defense area so that the unit commander can coordinate with other friendly forces in the rear area, to prevent gaps or voids in target acquisition or surveillance plans and to prevent the enemy from operating undetected.

5. SUMMARY. The maintenance company commander has two responsibilities: accomplish his mission and protect his unit. Beginning with appendix B, the remainder of this special text gives the unit commander a basis for planning, training, and conducting the defense of his unit.

Reference: FM 31-81, Base Defense.

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APPENDIX B

ORGANIZATION OF A PERIMETER DEFENSE

1. GENERAL. Maintenance units will defend their equipment and personnel from a perimeter defense, manned entirely from their own resources or in conjunction with other units. A perimeter defense provides all-round security, a limited amount of terrain to protect, a secure area to conduct normal support activities, and mutual support of positions. To insure success in defending the perimeter, the unit commander must integrate all resources available to him. This appendix provides guidance on how to organize those resources.

2. PLANNING THE DEFENSE. Once a unit location is determined, the commander uses the factors of METT plus T (Mission, Enemy, Terrain and Weather, Troops Available, plus Time) to develop the perimeter plan. The mission will be specified. The weather is also a constant factor that can't be changed, only exploited. The commander can influence the use of terrain, his personnel, and the available time to insure an adequate defense.

a. Terrain. Proper utilization of terrain can significantly increase the ability of the unit to defend itself. Terrain is usually analyzed in terms of avenues of approach. An avenue of approach is a route which an enemy force of a particular size utilizes to accomplish its mission. The commander identifies those avenues of approach that threaten his unit. His analysis will determine the size of the force that could attack the unit, whether the avenue will support a mounted or dismounted attack, and what the most and least likely avenues are. Prior to designating positions for his crew-served weapons and subordinate elements from which to cover avenues of approach, the commander must conduct a thorough reconnaissance of the unit site from the enemy's viewpoint. This will enable him to more clearly identify the strengths and weaknesses of the position and issue a defense plan that maximizes the terrain. As a minimum, this reconnaissance would be conducted out to the maximum effective range of his crew-served weapons (M60), at least 1100 meters.

b. Flexible Strength. One of the problems facing the commander is the determination of the number of personnel available to defend the unit.

(1) Number of personnel assigned.

(2) Minus personnel on sick call, in hospitals, etc.

(3) Minus company headquarters: Co Cdr, XO, 1SG, switchboard operator, etc.

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(4) Minus personnel whose duties require them to be absent from unit: recovery crews, parts personnel, contact teams, etc.

(5) Equals personnel in unit area available for unit defense.

(6) Divide by two to determine number of foxholes.

(7) During the normal operations, not all positions can be manned. Approximately 50% of the available personnel will be performing mission support activities. The other 50% have to have rest, perform personal hygiene, eat, and perform guard duty. The commander should expect to utilize only about 10-15% of his unit strength for unit security during normal operations.

c. Perimeter Plan. Once the commander has thoroughly analyzed the terrain and determined the amount of personnel he has available to defend the unit, he develops a perimeter plan.

(1) The critical element of the plan is the positioning of his crew-served weapons. Discounting the .50 caliber M2 machinegun, which may be away from the unit on a recovery vehicle, the M60 is the only crew-served weapon available for employment by the unit. The M60 mounted on its tripod can deliver fires out to 1100 meters. Grazing fire out to 600 meters can also be achieved. Use of the tripod with the traversing and elevating mechanism allows accurate fires during periods of limited visibility.

(a) The commander should personally select the M60 positions. The ideal locations will allow the machinegun to fire across the front of the unit on a final protective line (FPL). The goal will be to interlock the FPLs of all the M60s so that a ground assault would have to pass through the kill zone of each weapon.

(b) A properly prepared range card for each weapon simplifies the job of the commander to insure the guns support his defense plan.

(2) In areas where a mounted threat exists, the commander will position his antitank weapons, the M72 LAWs, to cover the avenue of approach in depth. Techniques of LAW employment are discussed in appendix H (Capabilities and Techniques of Employment of Antitank Weapons). The key to successful LAW employment is to attack the enemy's armor from the sides in predesignated kill zones that are integrated with antitank mines and obstacles.

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(3) The last major element of the defensive plan is the positioning of the major subordinate elements. The commander should place his dual-purpose weapons (M203/M16) where he can take advantage of their area coverage. With a maximum effective range of 350 meters and a casualty radius of 5 meters, the M203 provides ideal coverage of low areas and dead space along the M60 FPLs. Personnel armed with M16s are positioned to protect the M60 machineguns, the antitank killer teams, and to cover dismounted avenue of approach. All positions must be mutually supporting. A 10-man squad can cover 100 meters of ideal terrain. Fighting positions, discussed in appendix D (Fighting Positions) should be positioned approximately 15 to 20 meters apart.

(4) A plan of fire support will complete the commander's perimeter plan. Even though the maintenance company does not have organic indirect fire assets, the commander must integrate indirect fires. Prior planning will reduce the amount of time necessary to obtain fire support in case of an enemy attack. Appendix L (Employment of Fire Support Systems for Unit Defense) discusses how the maintenance company can obtain fire support when needed.

d. Early Warning Plan. Since the majority of the unit's personnel will normally be involved in mission support, early warning of the enemy's approach is paramount. One of the responsibilities of the rear area commander or the supported unit is to furnish the maintenance company with information on the enemy and friendly situation. However, every unit is responsible for its own local security. Two methods available to achieve total security are patrols and observation posts.

(1) Appendix E (Employment of Observation Posts) discusses observation post (OP) site selection. OPs should cover the most dangerous avenues of approach and have overlapping coverages. All personnel on the perimeter must know the location of the OPs and be alerted when they are withdrawn.

(2) Appendix F (Patrolling Techniques) covers the scope of reconnaissance patrols designed to provide early warning in the forward defense area.

e. Obstacle Plan. The commander seeks to increase the effectiveness of his defensive fires. One technique available is to delay the advance of the enemy through the use of obstacles. The unit obstacle plan should integrate all natural obstacles to the fullest extent possible. The maintenance company does not have sufficient available manpower to create extensive artificial obstacles. One technique is to use hasty protective minefields which are discussed in appendix J (Employment of Obstacles).

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f. Communications Plan. Appendix I (Communications) discusses the techniques used by the maintenance company to communicate internally and with its headquarters and supported units. Just as important as the communication system is the need to keep all personnel fully informed as to the situation and to specifically detail to them their role in the unit's defense plan. If everyone in the unit understands the concept of the defense, then the impact of losing communications and/or key personnel can be minimized during an enemy attack.

g. Reaction Force Plan. A reaction force to reinforce the perimeter, where threatened, or to restore the continuity of the perimeter, if penetrated, must be planned for. Personnel not on the perimeter, such as cooks and company headquarters personnel, should be designated as members of the reaction force. The reaction force should be trained extensively in assault tactics, including movement under fire. A predetermined assembly area should be designated as well as the assembly signal. Rehearsals, especially during periods of limited visibility, must be conducted.

h. Air Defense Plan. The primary air defense of the rear area will be provided by air defense units. Maintenance units will be required to augment air defense fires within the capabilities of their organic small arms. Appendix M (Employment of Organic Weapons for Air Defense) will provide the commander information needed to plan a small arms air defense for his unit area.

3. CONDUCT OF THE DEFENSE. Constant supervision by the commander will assure that the unit defense is completed in a timely, efficient manner.

a. Priority of Task. By clearly defining the priorities in establishing the position, the commander can allocate his resources and prevent needless duplications.

(1) First establish local security. By placing emphasis on early warning, more of the unit can be directly involved in preparing the unit position. By increasing the number of OPs, for example, 70 or 80% of the unit can be working instead of providing security.

(2) Position crew-served weapons.

(3) Clear fields of fire. By selectively clearing vegetation, working from the friendly position toward the enemy, the effectiveness of the weapons can be increased. Care must be taken to disturb as little as possible when concealing the fighting positions.

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(4) Prepare defensive positions. Appendix D (Fighting Positions) shows the correct method of siting and constructing individual and crew-served weapons positions.

(5) Emplace obstacles.

(6) Emplace communications.

(7) Continue improvement.

b. Actions During Enemy Attack.

(1) Probing attack. Hold fires until enemy is well within range. Leaders control return fires. Avoid revealing positions of machineguns and antitank weapons.

(2) Deliberate attack. Engage enemy at farthest possible range. Use available indirect fire to avoid disclosing unit's exact location. Have OPs act as forward observers if possible. Use direct fires as enemy closes. The volume of fire should increase as enemy nears positions. Call for final protective fires (FPF) when enemy attempts an assault to overrun position. Use reaction force if necessary to beef-up defense in threatened sectors.

(3) Artillery/NBC attack. Have personnel take cover and mask within 9 seconds. Sound NBC alarm if required.

4. ACTIONS AFTER ATTACK. Reconstituting the defense should begin immediately upon the enemy's withdrawal. Steps to be taken are:

a. Reestablish security.

b. Report to higher headquarters.

c. Redistribute/resupply communication.

d. Reposition fighting positions if necessary.

e. Reestablish communication.

f. Evacuate dead and seriously wounded.

g. Replace or repair obstacles.

h. Refurbish camouflage.

i. Resupply.

References: FM 7-7, The Mechanized Infantry Platoon and Squad.
FM 7-20, The Infantry Battalion.

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PERIMETER DEFENSE CHECKLIST

1. Security (LP's/OP's) Emplaced

   a. In covered and concealed locations with good observation?

   b. Have good communications?

2. Crew Served Weapons (LAWS too)

   a. In position?

   b. Have good fields of fire?

   c. Have ammo and cleaning equipment?

   d. Camoflaged and protected?

   e. Range cards prepared?

   f. Fires interlocked with other weapons?

3. Individual Fighting Positions

   a. Locations have been selected?

   b. Soldiers know where to go?

   c. Covered and concealed?

   d. Concealed from air observation?

   e. Sited to have interlocking fires with other positions?

   *Note - Fighting positions should be dug in and provided with overhead cover as time permits.

4. Obstacles Emplaced (Wire, metallic mines)

   a. Tied in with natural obstacles where possible?

   b. Covered by fire and observation?

   c. Placed on likely enemy avenves of approach?

   d. Unit has higher HQ's OK to lay mines?

   e. Minefield record properly filled out?

   f. Provision made to retrieve mines and wire when units departs area?

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g. Obstacles sited to our advantage - not the enemy's?

5. Communications Emplaced

a. Wire commo with OP's and machinegun positions?

b. Runners are designated and briefed?

c. Radios used as back up as available?

d. Pyrotechic signals planned for and available?

e. Personnel briefed on pyrotechic and other special signals?

6. Continued Improvements to Perimeter

a. Fighting positions improved?

b. Fields of fire cleared and checked?

c. Double wire lines laid between field phones?

d. Alternate positions identified?

e. Obstacles strengthed and improved?

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REACTION FORCE CHECKLIST

1. Composed of people not normally on perimeter?
2. Have a designated rally point and signal?
3. Have an NCO in charge?
4. Should have at least one machinegun.
5. Are trained and rehearsed?

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EARLY WARNING CHECKLIST

1. Do all personnel know current password - especially those on OP/LP duty?
2. OP's/LP's
   a. Enough to give over-lapping coverage for perimeter?
   b. Are far enough out to give adequate warning?
   c. Have reliable wire or messenger communications with perimeter or CP?
   d. Have a concealed route back to perimeter?
   e. Are in a position to observe likely avenues of approach?
   f. Have good concealment and cover?
   g. Are relieved every 2 hours or so?
3. Is information exchanged with other units in area?
4. Are recon patrols sent out periodically?
5. Are trip flares, night observation devices, and rattle cans used after dark?
6. Are local inhabitants and intelligence sources consulted?

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APPENDIX C

SOVIET THREAT TO US ARMY REAR AREA

1. Purpose. To describe Soviet doctrine, equipment, and tactics and their significance to combat support and combat service support operations.

2. General.

a. The Soviet concept of operations is based on the expectation that future warfare will be highly mobile. In their view, the nature of the battlefield will require forces which can be concentrated quickly, move rapidly, remain protected from enemy fire and nuclear effects while moving, and create shock effect deep in enemy rear areas. To meet expected requirements of the future battlefield, the Soviet Army has organized a combined arms force built around tank and armored fighting vehicles reinforced with combat support and service support units. The Soviets recognize that all this must be done jointly with other services. Soviet success, therefore, is based on responsiveness of doctrine, equipment and tactics to requirements generated on the battlefield.

b. Once the decision has been made to conduct military operations, Soviet strategy and tactics call for a rapid defeat of enemy forces. In order to accomplish this objective, the Soviets will attempt to smash through defenses with armor heavy forces or bypass these defenses, where possible, to rapidly strike the operational rear. Once in the operational rear, the Soviets will seek out and destroy reserve forces, and supply and command and control facilities in a series of meeting engagements and hasty attacks. Air operations are described below. Regardless of the type of attack, the Soviets will employ large numbers of men and equipment to overwhelm defenses. If a breakthrough of defenses in some areas is required, the Soviets will concentrate a force against the breakthrough sector which will have, as a minimum, a favorable ratio of 3 to 1 in personnel, 4-5 to 1 in armor and 6-8 to 1 in artillery support. Breakthrough operations, or deliberate attacks, will normally begin with a heavy artillery concentration on forces in contact and air attacks against rear area targets. As the artillery shifts to tactical rear areas, front line defenders will be faced with ground attack by armor heavy, combined arms formations, designed to rupture defensive positions, thrust into the rear area, or prepare a corridor for 2d echelon units, usually tank heavy, to exploit the rupture. This type operation is more likely to occur at numerous places on the battlefield in the form of small breakthroughs, i.e., one or two regiments breaking through a battalion sector or a division through a brigade sector, than in one great operation having an Army concentrating against a division.

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3. Threat to Combat Support (CS) and Combat Service Support (CSS) Operations. Modern warfare is characterized by total involvement of all types of operations. As a result, a different perceived threat cannot be described for each CS and CSS operation. Therefore, each user must judge his vulnerability to each Soviet capability discussed. A major element of Soviet military doctrine is disruption of rear area operations including, but not limited to, command and control centers, communications networks, supply facilities, airfields, and reserve echelons. Such disruption may be carried out either deep in the rear in what appear to be independent operations or behind the main battle area closely coordinated with the initiatives of maneuvering forces. Forces employed in the rear area include: air-dropped or air-landed conventional units; special operations teams specifically trained for reconnaissance and sabotage; and activated sleeper agent cells and networks. The Soviets also possess the capability to support rear area operations with tanks, artillery, air attacks, radio electronic combat, and nuclear and chemical assets. Introduction of naval infantry in coastal and near-coastal areas is within the capabilities of the Soviets. Following are salient features of the Soviet threat that have the most direct effect on CS and CSS operational missions in divisions through theater army.

a. Air Support.

(1) General.

Aviation will play an important role in the success of ground operations. As a result of high maneuverability and irregular development of combat actions, there may arise conditions under which missile weapons and artillery cannot be effectively employed against targets. There is the possiblity that such weapons could lag behind the advancing units and formations of ground troops for a considerable period of time, because of mobility restrictions such as damaged roads and obstructions, contaminated areas or blown bridges. For this reason, it is possible that during the most intense periods of combat operations, ground troops may find themselves temporarily without adequate ground fire support. In such cases, aviation is capable of providing timely support to advancing troops. For this purpose, the Soviets believe they can use fighter-bombers, fighters, and combat helicopters with sufficient effectiveness. At the present time, the Soviets are devoting a great deal of attention to the close support of ground troops and the methods of combatting mobile armored vehicles, especially tanks. However, they believe that to use their current fighter and fighter-bomber aircraft in that role is not always justified. Therefore, their plans call for consolidating the efforts of combat helicopters and the ground force means for that purpose, while tactical aircraft destroy the tanks and other mobile

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targets in concentration areas before they are committed to battle. The increased effectiveness of the armament of modern aircraft and improved means of identification and target designation increase the possibility of destruction of targets with a comparatively smaller number of aircraft.

(2) Reconnaissance. The Soviets possess a wide variety of supersonic and subsonic aircraft for collecting information on movements, dispositions, and communications; e.g., the MIG-25 (FOXBAT), TU-95 (BEAR), Yak-28 (BREWER), and other aircraft, as well as remotely piloted vehicles. Some of the reconnaissance systems have a ground link capability so that attack aircraft artillery and/or rockets can be quickly employed against identified targets.

(3) Tactical Aircraft. In the initial stages of combat, Soviet tactical aircraft will seek to achieve local air superiority by destroying our interceptor aircraft on the ground and by suppressing air defenses in the corridors leading to airfields. In rear areas, they also attempt to destroy nuclear delivery units, communications facilities, and command and control elements. Once these priority targets have been destroyed, attacks are to be expected against ammunition dumps, POL (petroleum, oils, and lubricants) sites, lines of communication, railway marshalling yards, canals, bridges, repair facilities, and logistical support areas. Preplanned armed reconnaissance missions are flown to search out, attack, and destroy targets along given vectors or in specified geographical areas. Soviet tactical aircraft include the SU-7 (FITTER-A), SU-17 (FITTER-C), MIG-21 (FISHBED), MIG-23 (FLOGGER-B), MIG-25 (FOXBAT), and MIG-27 (FLOGGER-D).

(4) Fighter-Bombers and Bombers. Attack by these aircraft in deep rear areas concentrates on ammunition supply points, nuclear storage facilities, ports, tactical missile and rocket units, command and control facilities, airfields, and logistical complexes. Bombers may come from naval aviation, long range strategic aircraft, or Frontal Aviation units, depending on the target. The TU-16 (BADGER), TU-22 (BLINDER), TU-95 (BEAR), Yak-28 (BREWER), and TU-26 (BACKFIRE), are the current aircraft employed in bombing roles. Several of these aircraft types carry air-to-surface missiles which increase their "stand-off" strike capabilities and increase the need for defensive measures at greater ranges.

(5) Helicopters. The Soviets have a large helicopter fleet which includes increasing numbers of heavily armed MI-24 and MI-8 HIP aircraft. There are also heavy-lift helicopters for moving supplies and troop carrying aircraft for air assault operations. The combat helicopters provide effective direct air support of ground troops,

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including development of success in rear areas, thus freeing fixed-wing aviation for other missions.

(6) Naval Aircraft. In conjunction with strategic aviation and surface or subsurface naval units, naval aviation can attack land targets. However, Soviet naval aviation aircraft (TV-16 (BADGER), TV-22 (BLINDER), T-26 (BACKFIRE), SV-17 (FITTER-C), and the Yak-36 (FORGER)) have as a primary mission the reconnaissance and protection of the sea lanes used by naval forces. Introduction of the Yak-36 (FORGER) VSTOL aircraft aboard the KIEV class carrier and the possibility of attack and assault helicopters being launched from MOSKVA class cruisers could create tactical problems for units deployed along coasts, in fixed ports or LOTS (logistics over-the-shore) operations.

b. Airborne Operations.

(1) General. Soviet airborne operations are normally executed by airborne divisions or regiments employed independently or as a part of an airborne force. Typical missions include:

(a) Seizure of important areas, routes, and crossings in advance of major operations.

(b) Exploitation of nuclear strikes by forestalling the enemy's attempts to close the breach in his defenses.

(c) Destruction of airfields, particularly those with hardened aircraft shelters, or, in certain circumstances, seizure of airfields for subsequent use by their own forces.

(d) Sabotage missions against nuclear delivery means, support units, and guidance equipment.

(e) Disruption of troop control, movement and logistic support by operations against selected headquarters, communications centers, rear area installations and lines of communication.

(f) Support of amphibious operations.

(2) Organization.

(a) The airborne division is smaller and more lightly equipped than the motorized rifle division. Each airborne division consists of approximately 7,300 men organized into three airborne regiments, an artillery regiment, and combat support and combat service support units as shown in Incl 1. The Soviets have a simultaneous airlift capability for the maneuver elements of two

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airborne divisions of the eight available. The major organizational differences between the airborne division and the motorized rifle division are the lack of tanks and the smaller reconnaissance and air defense elements in the airborne division.

(b) Primary weapons of the airborne division include the BMD amphibious armored airborne combat vehicle with one 73mm cannon and AT-3 SAGGER, the ASU-57 and ASU-85 assault guns, the D-30 122mm towed howitzer, the RPU-14 16-barrel 140mm multiple rocket launcher, the SD-44 85mm auxillary propelled antitank gun, and the ZU-23 23mm twin-barrelled towed antiaircraft gun. Other weapons include the SA-7/GRAIL portable surface-to-air missile (SAM), the RPG-7D antitank grenade launcher, and a PK-RPK series machinegun. Individual weapons are the 9mm PM pistol and the AKS-74 5.45mm rifle.

(c) All the major weapons are air transportable in the three major transports currently in the Soviet inventory, the AN-12/CUB, the AN-22/COCK, and the IL-76/CANDID. Many of the lighter weapons can also be lifted by Soviet helicopters, such as the MI-6/HOOK and the MI-8/HIP, for airmobile operations.

(d) Though the airborne division is relatively lightly equipped, it possesses significant combat capabilities that are well suited to its intended role of combat operations in the enemy rear until link-up with advancing Soviet ground forces is achieved. The ratio (in terms of number of weapons per thousand troops) of crew-served and individual antitank weapons, for example, is nearly twice that found in the motorized rifle division; while the airborne division has relatively few crew-served air defense weapons, the ratio of SA-7 SAM is nearly three times that in a motorized rifle division. Though vehicles such as the BMD and the ASU-85 are only lightly armored, they provide airborne forces with significant firepower and mobility.

(3) Types of Operations. Airborne operations are divided into the following categories:

(a) Strategic. Strategic operations involve the use of one or more airborne divisions in considerable depth in order to: establish a new front in a theater of operations; seize air bases, seaports or islands of strategic importance.

(b) Operational. Regimental size operations up to depths of 300 kilometers beyond the FEBA in support of a Front offensive. Ground forces link up within two to three days with the airborne forces.

(c) Tactical. Battalion to regimental size operations at

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depths of about 100 kilometers in support of an Army offensive. Link up is planned within 48 hours.

(d) Special Purpose. Operations by groups up to company size with missions of:

- o Sabotage
- o Destruction of command, control and supply.
- o Reconnaissance and Intelligence.
- o Support of guerrilla activities.

(4) Principles of Soviet Airborne Operations. Soviet doctrine for airborne operations prescribes the following principles:

(a) Surprise.

(b) Landing in undefended areas or areas where defenses, particularly armor, have been effectively neutralized.

(c) Effective air defense for the airborne formation and the suppression of air defense weapons along the flight route.

(d) Fire support for the parachute operation by missiles, artillery, and air strikes provided by advancing ground forces and aviation.

(5) Ground Tactics. Airborne inserted forces adopt vigorous offensive tactics within the limitations of their equipment.

(a) Reconnaissance. Bold reconnaissance is carried out by subunits detailed from parachute battalions and dropped in the first wave. Helicopters may later augment the reconnaissance effort.

(b) Movement. Movement is mainly on foot although some vehicles are dropped with the assaulting troops. Transport is augmented by captured vehicles. Movement at night is preferred.

(c) Attacks. Attacks are launched from the line of march and whenever possible from the flanks and rear.

(d) Defense. Company and platoon strongpoints are established covering the likely approaches. Whenever possible, these are mutually supporting, with particular emphasis on antitank weapons. Gaps normally exist between battalions and are covered by

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patrols or ambushes.

(6) Sabotage, Disruption and Airfield Attacks.

(a) Sabotage Missions. Sabotage missions are usually carried out by a force of up to company strength, reinforced with specialists. Main targets are nuclear delivery means, their resupply and support facilities, and missile guidance equipment. Equipment of intelligence value may be evacuated intact. Nuclear weapons on the move are ambushed. After a raid or ambush, sabotage groups move out to an assembly area for withdrawal or further operations.

(b) Disruption. Parachute assaults may be carried out with the specific tasks of destroying headquarters and logistic installations, and of disrupting movement and the operation of the logistic system.

(c) Attack on Airfields. Operations against an airfield are carried out by a force of battalion to regimental size. It is normally reinforced with engineers to repair the airfield facilities, if the Soviets wish subsequently to use them, or to demolish the facilities to deny their use. If possible, the drop is made directly onto the airfield. If the objective is to be secured for use, a defensive perimeter is established.

c. Air Assault Operations: The Soviets make considerable use of helicopter assaults to seize or destroy vital areas in coordination with ground operations. These operations are normally conducted by motorized rifle troops. A graphic portrayal is at Incl 2 of a Soviet heliborne assault by a Soviet motorized rifle battalion against a US Army brigade tactical operations center (TOC) and brigade trains.

d. Maneuver Forces.

(1) Armor Operations. In any major battle involving armor, there exists the possibility that the attacking force will drive the defender into his own rear area. When this happens, the Soviet force may attack any installation or troop formation encountered. Soviet doctrine states that the primary mission of the attacking armor of first echelon forces is to break into the deep rear area, bypassing defensive positions. Second echelon forces will destroy bypassed units. Because of this, it is possible that Soviet tank formations will push into the rear areas, causing a shift in US forces for counterattack or defensive redefinition.

(2) Artillery and Missile Operations. The Soviets have long-range artillery, up to 240mm, that can fire out to 20km beyond the FEBA. Their doctrine calls for massed barrage fires in advance of a major attack. These fires will shift from the FEBA to deeper

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targets, as required. It is not expected that artillery at higher levels will be dedicated in support of small unit attacks in the division rear area. That is because each motorized rifle battalion has organic mortars. However, artillery forward observers may accompany the attacking force, thus providing the capability of shifting fires to major command and control facilities and logistical clusters, as needed. In addition to conventional artillery, the Soviets have missile launcher units that can fire missiles capable of delivering high explosive chemical or nuclear warheads to ranges of 300 to 500 km (SCUD) and 50 to 70 km (FROG) beyond the FEBA. Their employment is usually in support of major attacks or against reserve formations, nuclear delivery units, command and control sites and logistical activities.

e. Amphibious Operations.

(1) General. The Soviets have revitalized their capabilities to conduct amphibious operations. They have tripled their naval infantry strength in the last 10 years and are building new seagoing assault craft to increase their capabilities. New developments in amphibious warfare ships and air cushion vehicles underscore Soviet determination to modernize their naval surface ship capabilities. The Ivan Rogov class ship, recently deployed, may be capable of carrying a complete battalion of troops and equipment. It also is capable of carrying ACV such as the AIST class air cushion vehicle which in turn is capable of carrying medium tanks. The combination of capabilities of these two surface craft directly enhance Soviet capabilities to conduct amphibious operations.

(2) Organization and Equipment. Naval infantry forces are organized into regiments and battalions consisting of approximately 15,000 troops. Equipment consists of PT 76 amphibious tanks, medium tanks, BTR 60 APC, mortars and antitank weapons. They may be supported by naval gunfire, armed helicopters and high performance aircraft. Selected ground force motorized rifle battalions, equipped with the latest medium tanks, BMP, mortars and ATGM, also receive amphibious warfare training and may be ordered to conduct amphibious assaults in coordination with naval infantry units. It can also be expected that airmobile and/or airborne operations may be conducted simultaneously.

(3) Missions. Naval infantry units may be assigned missions as follows:

(a) Beach reconnaissance.

(b) Clearance of beach obstacles.

(c) Conduct of raids.

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(d) Attack as initial amphibious assault wave.

(4) Motorized Rifle Battalions. These may be assigned amphibious assault missions as follows:

(a) Capture of key terrain and installations (logistics complexes, ports, coastal airfields, etc.).

(b) Conduct of diversionary raids and reconnaissance.

(c) Securing a beachhead for the opening of a new front. These operations would be primarily designed to aid land offensives already in progress or about to start. Often, they would be conducted in conjunction with airmobile and/or airborne operations.

(5) Assault Landing. The assault may be preceded by a heliborne/airborne operation in conjunction with air attacks in the objective area. These forces would probably have the mission of blocking the arrival of enemy reinforcements into the beachhead. In an unopposed landing or against light resistance, the MRB, in most cases, off loads on the beach. In an opposed landing, BMP, amphibious tanks, and/or tanks equipped with snorkels leave their landing ships at sea and swim ashore. Once ashore, the MRB attack is similar to conventional operations. US logistical support units must be aware of the implications of battalion sized enemy units armed with a full complement of destructive weapons operating independently in their area with the specific mission of disrupting logistical support to the main effort.

f. Special Operations.

(1) Special Purpose Forces. The Soviets maintain highly trained special purpose forces. These forces are manned by skilled officers and senior NCO's, whose training includes demolitions, communications, foreign weapons and languages. Even before the first battle actually commences, these forces may be deployed in small units. Entry can be accomplished by numerous methods, including: air drop, helicopter, vehicle, foot, and by sea. These units, wearing NATO uniforms and speaking Western European languages, including English, will attempt to penetrate military facilities, march columns, and organizations to disrupt, destroy or mislead NATO forces.

(2) Deep Cover Agents. The Soviets train foreign nationals worldwide in collection of information, and subversion and clandestine operations. Training includes all methods of clandestine communications, espionage, sabotage methods and use of explosives, incendiaries, acids, and abrasives. These agents return to their home countries and maintain secrecy, refraining from any contact with

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known communists or to other subversive elements. They remain as deep cover agents or "SLEEPERS." Their activation would be keyed to a buildup in preparation for war.

(3) Terrorists. Groups whose sole stated purpose is the overthrow of their government or economic system may attempt to cnduct their own terrorist activities during hostilities. Their actions may be directed against civilian populations, host nation military forces, US dependents and military forces, and commercial/ military facilities.

(4) Sympathizers. It may be also assumed that among the populations of NATO countries there are numerous people who are sympathetic to the Soviet Union and the Warsaw Pact countries. While not part of any organized agent activity, they do constitute a threat to military personnel, logistic facilities and communications in rear areas. Their activities may include random acts of sabotage, arson, theft and assassination.

(5) Underwater Demolitions. A significant threat to the operation of Western European ports would be Soviet underwater demolition operations. The Soviets and some of their allies have developed a significant capability to perform underwater demolition operations. They have well-trained, well-qualified underwater demolition teams equipped with modern sophisticated equipment.

(6) Port Workers. In addition to the threat from underwater demolition operations, the operation of the ports may be harassed by militancy of dock workers, influenced by the communist parties within the various countries, and the readiness of labor elements to resort to strike actions. These elements vary from country to country, and their sympathies may change with the passage of time. Thus, it should be kept in mind that the situation is extremely fluid and subject to change because of varying sociological, political, and economic conditions that prevail in the port cities of Western Europe.

g. Radio Electronic Combat (REC).

(1) The Soviets have developed their EW capabilities into an integrated system called REC. It combines signal intelligence, direction finding, intensive jamming deception, and suppressive fires to attack enemy organizations and systems through their means of control. Loss of communications is the loss of troop control which invariably leads to defeat. Soviet REC equipment to achieve this goal is impressive. An estimated goal is to destroy or disrupt at least 50 percent of the enemy's command, control and weapons system communications, either by jamming or destructive fires. REC

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activities are considered integral to all combat operations.

(2) In implementing REC, Soviet planners have established mathematical models to estimate "critical times" in command and control procedures. This critical time is defined as the sum of the times required to complete a sequence of steps in control: collection and reporting of data; evaluation and decision; issuance of orders and preparation; and completion of action. Against this background, the aim of REC is to disrupt the enemy's critical time phasing to the extent that perishable information, on which decisions and orders are based, is obsolete.

(3) Soviet REC units continuously analyze enemy communications to locate nets as an ongoing part of the overall intelligence effort.

(a) REC operations include:

1. Electronic reconnaissance to include detection and location of radars, command posts, communications centers, and nuclear delivery systems.

2. Jamming in support of air defense operations, suppressing:

- o radar bomb sights
- o radio navigation equipment
- o radio control links for ASM and SSM

3. Jamming in support of ground operations, suppressing:

- o radars
- o command posts
- o communication centers
- o nuclear delivery systems

(b) Principal methods are:

1. Radar jamming by using barrage and spot noise, pulse, chaff, and decoys.

2. Electronic jamming of command guidance systems--using pulse and simulation techniques.

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3. Radio communications noise jamming of AM and FM signals.

(4) In locating enemy electronic emitters, direction finding along with other measures, is used to locate the targets for suppressive fires. But direction finding alone, because of its lack of precision in locating radio transmitters, may not be sufficient for the use of multiple rocket launchers against soft targets, since they deliver a high volume of fire in wide dispersal. Jammers are most easily detected because of their peculiar signal and power output.

(5) Each Soviet tactical air army will have several organic support squadrons with aircraft equipped to conduct electronic warfare missions. These units can conduct electronic reconnaissance missions and ECM against radar, electronic guidance, and communications systems. The most common air ECM operations are spot or barrage jamming and dispersing against enemy air defense early warning and fire control radars. Bombing operations of the tactical air armies will be protected or electronically camouflaged by aircraft using ECM in either a stand-off or escort role. Jamming equipment with an effective range up to 200 kilometers and covering frequencies used by NATO air defense radars, is installed in these ECM aircraft.

h. Nuclear, Biological and Chemical.

(1) Soviet ground forces are undoubtedly the best NBC equipped, trained, and organized units in the world today. They have a formidable arsenal of offensive weapons including missiles, rockets, MRL and aircraft delivering both nuclear and chemical warheads against both troop concentrations near the FEBA and against rear area installations and formations. Based upon Soviet writings, it appears that if the need arises, the Soviets will not hesitate to use weapons of "mass destruction" to achieve their goals. Besides an impressive offensive capability, the Soviets possess a defensive capability, in both individual and collective protection, second to none, which will afford them a greater degree of freedom from the debilitating/lethal effects of NBC weapons.

(2) The initial impact of NBC weaponry is greater on rear areas than on front line units. This can be seen from their priority list of targets, which are:

(a) Nuclear delivery means--including aircraft, artillery, missiles, and rockets.

(b) HQ of division and higher echelons.

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(c) Communications centers and storage sites (especially nuclear).

(d) Reserves and troop concentrations.

(3) Nuclear and chemical warhead allocations will be weighted to the main axes of attack and will be combined with conventional weapons to achieve maximum casualties against defending forces.

(4) The Soviets most probably have some biological capability and could use biological weapons should the need arise. These weapons would be used to contaminate reserve forces, supply depots and rear area installations to decrease the support to front line units.

2 Inclosure
Airborne Division
BMD Vehicle

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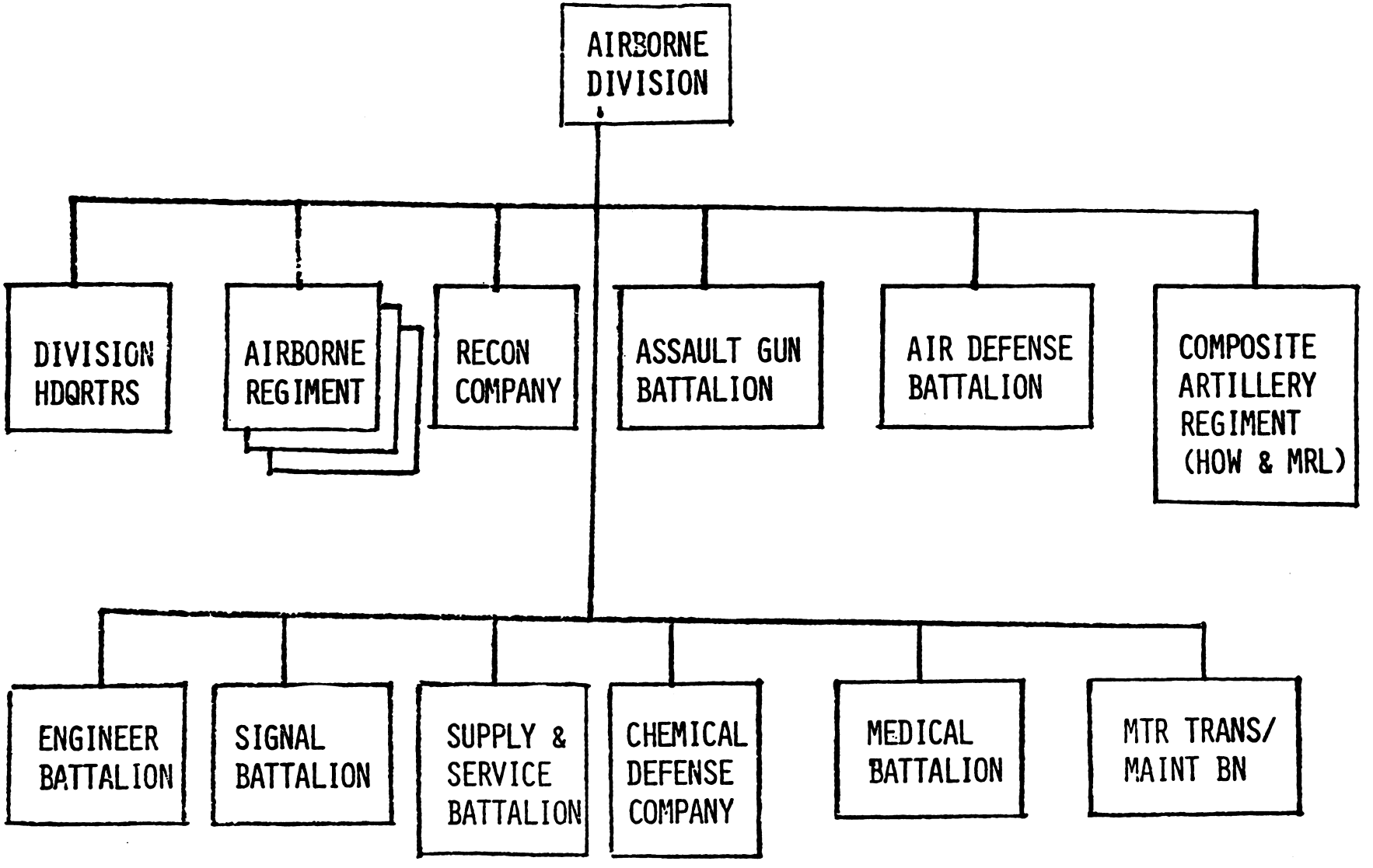

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TEK SPEKS

The BMD Airborne Infantry Combat Vehicle

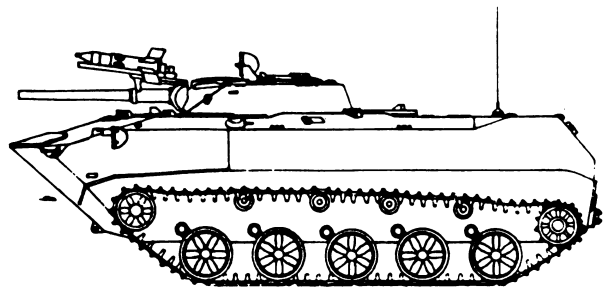
Paul Fein

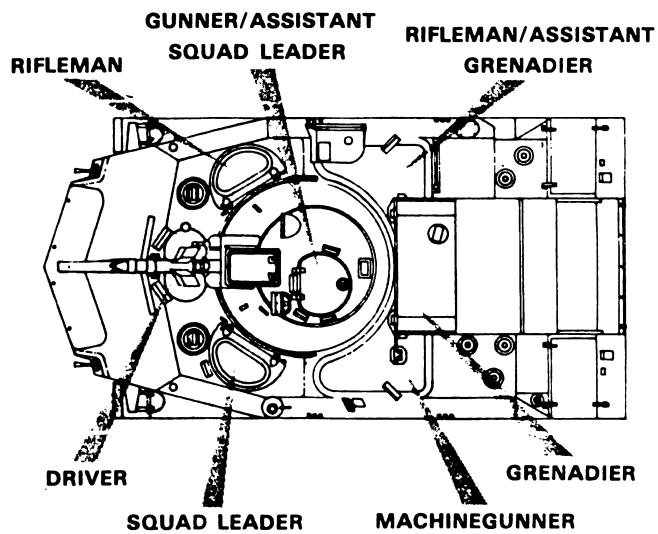
This article is based upon information derived from open Soviet sources and represents the author's analysis and current DIA data.

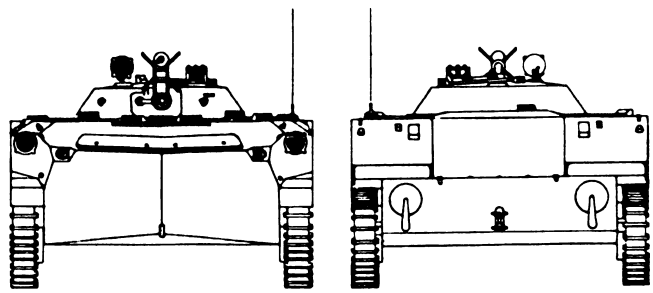
The design features of the BMD are very similar to those of the BMP. Both carry infantry which are able to fire their weapons from inside the vehicle. Both are amphibious (the BMD uses waterjets while the BMP employs track propulsion). Both carry significant onboard weaponry to include a 73-mm main gun, machineguns, and antitank guided missiles, and both feature CBR filtration systems. However, the BMD is specifically designed to be airdroppable and has so far been deployed only with Soviet airborne units.

Because the engine of the BMD is mounted in the rear, the troop-carrying capacity of the BMD is more limited than the BMP. In all likelihood the squad/crew configuration for the BMD would be one squad leader (with an AK assault rifle), one rifleman (with an AK), one rifleman/assistant grenadier (with an AK), one grenadier (with an RPG rocket-propelled grenade launcher and pistol), one machinegunner (with a light RPK machinegun), one driver, and one gunner (who could possibly be the assistant squad leader). The positions for each of the individuals is shown in the accompanying diagram. The vehicle, however, is capable of holding eight personnel under normal conditions; and it is possible that there may be another individual inside the vehicle who does not have a position at a vision block.

The turret of the BMD appears to be identical to that on the BMP; however, the BMD turret is placed well forward on the hull. In addition to the 73-mm gun and 7.62-mm PKT coaxial machinegun, the BMD mounts two PKT bow machineguns. Since the suspension system is hydropneumatic and variable, the ground clearance can be changed to a limited degree to fit the terrain or combat situation. It is the troop-carrying, amphibious, and airdroppable capabilities in combination with the onboard and troop firepower which make the BMD one of the unique combat vehicles in the world.







BMD

Inclosure 2

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APPENDIX D

FIGHTING POSITIONS

1. GENERAL. A maintenance company is not a combat unit, yet it must accomplish its mission on a lethal battlefield. A maintenance unit is most vulnerable when it is performing its normal support mission, so the commander must seek methods to reduce his unit's vulnerability. One way to achieve that reduction is through construction of expedient fighting positions so that if the unit is attacked, it can defend itself.

2. FIGHTING POSITION REQUIREMENTS. A fighting position for a maintenance unit must:

a. Protect against small arms fire.

b. Protect against indirect fire fragments.

c. Protect against aerial and ground observation.

d. Provide for protected fighting and mutual support if an enemy advances against it.

e. Provide CONFIDENCE TO FIGHT AND WIN!

3. FIGHTING POSITION FUNDAMENTALS. The commander analyzes the factors of mission, the enemy, terrain, and his available resources to develop a defensive plan for his unit. The commander also makes a detailed reconnaissance of the area to be defended. He tries to maximize the fundamentals of cover, concealment, suppression, and teamwork.

a. Cover is the physical protection from weapon effects leading to a reduction in the likelihood of casualties from direct or indirect fires. Often, nature provides natural cover for the front of the position. The well-selected site facilitates the preparation of cover against indirect fires as well.

b. Concealment prevents the enemy from pinpointing the location of the position. If natural concealment is not available, then camouflage must be used.

c. Suppression means the position has fields of fire which allow the occupant to engage the enemy at the maximum effective range of his weapon to the front, and to the flanks in support of other positions to the right or left. Long-range fires suppress, break up attack formations, and disrupt enemy control and cohesion. Close-in fires deliver the most lethal small arms fires on the enemy since they engage him from an unexpected

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angle at short range. In the main, a location on the ground either affords these fields of fire or it does not, and thus the original choice of a site position is crucial.

d. Teamwork (mutual support) must also enter into the selection of the site for a fighting position. The leader must position his forces so that his fires are integrated to provide mutual support for each position.

4. WORK PRIORITIES. Once the commander has thoroughly reconnoitered his defensive sector or unit location, and selected his positions based upon all of the considerations already discussed, he emplaces his soldiers and carefully describes to them the role each is playing in the defense. The description must include the general shape of their overall position, its orientation, the requirements for overhead cover, and sectors of fire. The soldiers then prepare their positions to a specified set of work priorities. A suggested list of priorities are:

a. Be Prepared to Fight at Any Time. The best position will do no good if the enemy is able to approach it undetected and unopposed. Leaders must post security as soon as possible after the unit position is occupied, and throughout the unit's stay. The position must be concealed and camouflaged throughout the time the work is being performed.

b. Emplace Sector Stakes to Support the Leader's Plan. The sectors of fire for each position will include both the longer range fires to the front of the position, and the fires to the flanks that will surprise the enemy and support neighboring positions. Assigned sectors of fire should allow for a great deal of latitude during periods of limited visibility, and permit one occupant to cover the entire sector of the position while the other sleeps. Stakes should be placed to define sectors of fire. Limiting stakes are also used to prevent accidental firing into adjacent positions.

c. Partially Clear Fields of Fire and Begin Digging. About the only measure to be taken to enhance fields of fire is the intelligent, selective clearing of vegetation and other obstacles that limit observation and fires from the position. Too much clearing will, of course, strip away natural concealment and make the position vulnerable to long-range detection, engagement, and destruction. The area must look completely natural throughout the construction process. Excess spoil must be disposed of as it is produced. The shape and orientation of the hole must allow full coverage of the assigned sectors of fire.

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d. Dig the Position Using Spoil to Supplement Natural Frontal Protection. Construct Rear and Side Protection as Necessary. It is essential that soldiers be below ground level and they must be protected when they rise up to fire. The amount of spoil required to give protection from direct fire weapons differs according to soil composition and range of the enemy weapon. Wet, packed sandbags afford three times as much protection as clay soil. For example, a 14.5mm machinegun firing armor piercing ammunition from 100 meters could penetrate only 2 feet of sandbags rather than 6 feet of clay soil.

e. Construct Overhead Cover. Indirect fire will cause the most casualties for a maintenance unit. Computer simulations have demonstrated that a platoon of 33 men spread throughout an area 250 by 50 meters, and fired upon by an artillery battery firing 30 rounds will have ZERO casualties if they are dug in with overhead cover. The same platoon will have NINE casualties if they are standing and engaged with variable time (VT) fuzed artillery projectiles. The ideal position will allow its occupants to continue to engage the enemy while receiving indirect fire. If constructing overhead cover for a position increases the risk of long-range detection, then it's wiser to dig the overhead cover to the flanks or rear of the position.

f. Complete Camouflage and Clearing Fields of Fire. Camouflage requires constant attention and it must be continuous. Remember the logical constraints on clearing fields of fire.

g. Continue to Improve the Position. No position is ever fully completed. Fighting positions also require maintenance if they are to provide the required level of protection.

5. CONSTRUCTION. The following extract of FM 7-7 provides a guide to construction of individual and machinegun fighting positions. Each soldier has to apply the basic principles to the terrain and enemy situation in developing his position.

6. SUMMARY. Fighting positions must enable the soldier to fight and win in a lethal environment. The position must permit the soldier to engage the enemy at the optimum range of his weapons, to kill, and to suppress without becoming a casualty. It must also instill in the soldier CONFIDENCE IN HIS ABILITY TO FIGHT AND WIN.

(EXTRACT BEGINS ON PAGE D-4)

References: FM 7-7, The Mechanized Infantry Platoon and Squad.
TC 7-1, The Rifle Squad.
TRADOC Bulletin 9, Infantry Fighting Positions.

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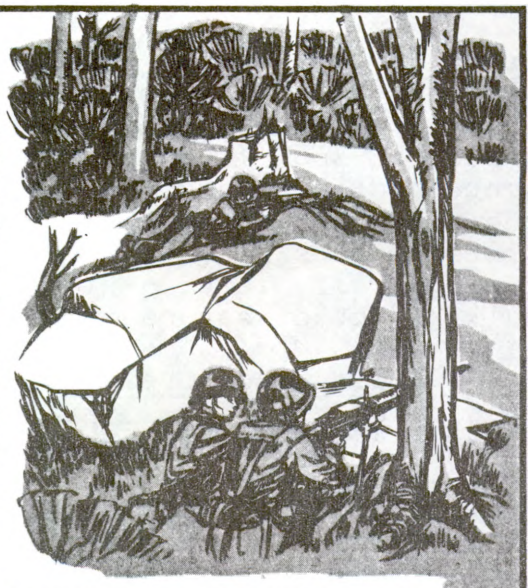
HASTY FIGHTING POSITIONS

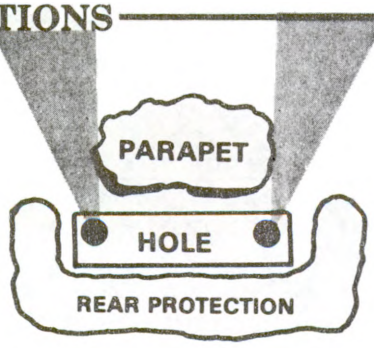
When you first move into a battle position you may have very little or no time to prepare the positions from which you must fight. If that is the situation, have your men occupy hasty fighting positions. A hasty fighting position is a position behind some natural object on the terrain that affords you frontal protection from direct fire but also allows you to fire forward. To provide protection from indirect fire, hasty fighting positions should put soldiers in a small depression or hole to get them as far below ground level as possible.



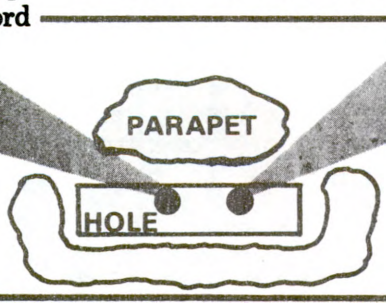
The term hasty position does not mean that you can't dig. Even if you only have a few minutes you can scrape out or dig a prone shelter that will give you increased protection.

HOW TO PREPARE FIGHTING POSITIONS

The basic fighting position is a two-man hole with frontal protection and a parapet around the sides and rear. The characteristics of the frontal protection and the parapet have already been described. The hole must be long enough to allow each soldier to fire around the frontal protection when not receiving effective small arms fire, wide enough for two soldiers wearing load bearing equipment, and at least armpit-deep. It should be as small as possible to afford maximum protection.



FIRE TO THE FRONT



FIRE TO THE OBLIQUE

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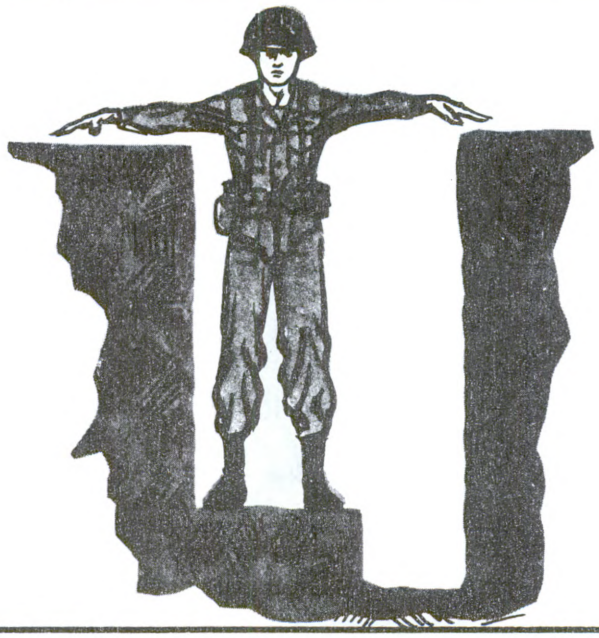
DIG ARMPIT-DEEP



Armpit-deep lowers the profile of the position, and still allows you to fire your weapon. You can dig deeper, but you will have to construct a firing step.

Measure this way . . .
don't guess.

PROVIDE SUPPORT FOR THE FIRER

The distance between the hole and the frontal protection should be wide enough to allow the soldier to fire from a supported position (one with elbows on the ground).

THIS . . .

supported fire to the front.

. . . NOT THIS

Unsupported fire to the front.

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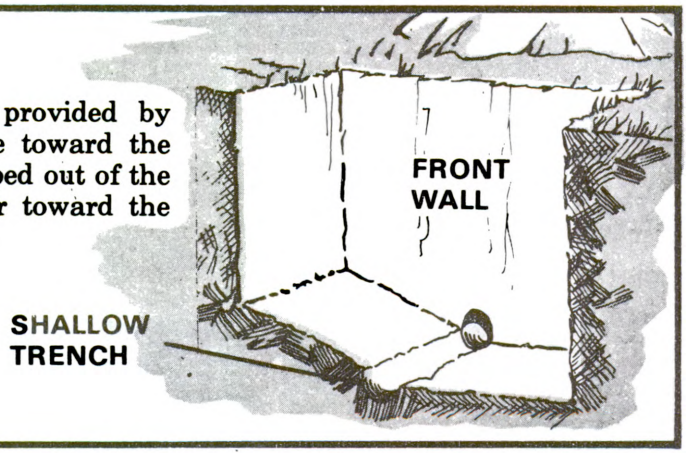
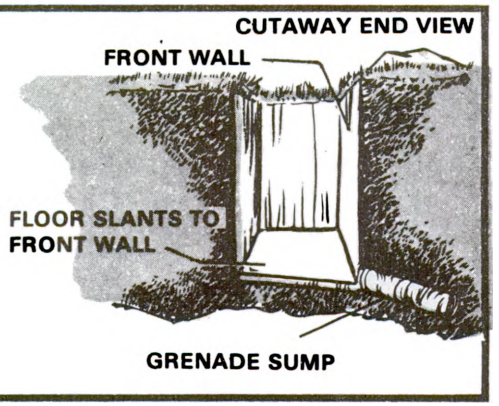
Dig ELBOW HOLES to stabilize your arms and lower your silhouette.

WATER DRAINAGE is provided by sloping the floor of you hole toward the center. A shallow trench scooped out of the floor will further direct water toward the front wall.



Grenade Sump. At the bottom of the wall toward which water will drain, use your intrenching tool to dig a hole downward at an angle of about 45 degrees, as wide as the shovel blade and as deep as you can dig. This sump is for hand grenades thrown into your position. The slant of the floor should channel such grenades into the sump and its mouth should be smooth and wide enough to be an easy target for kicking grenades there, too.



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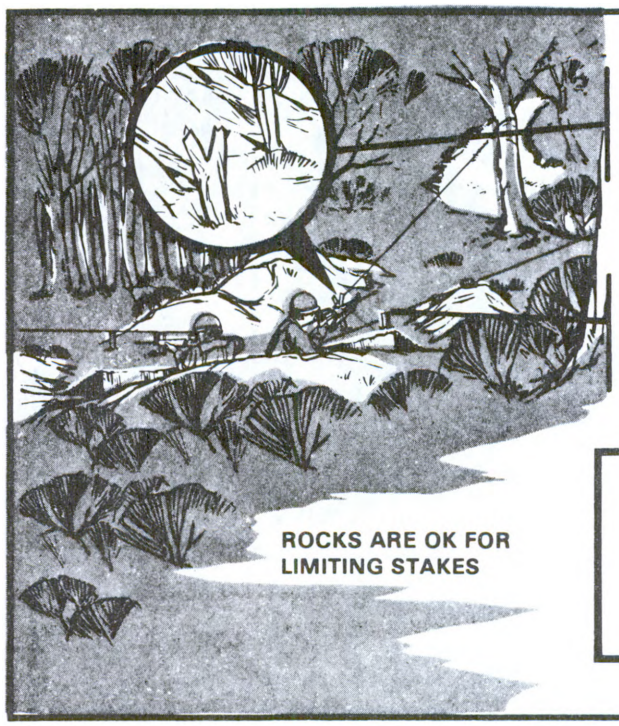
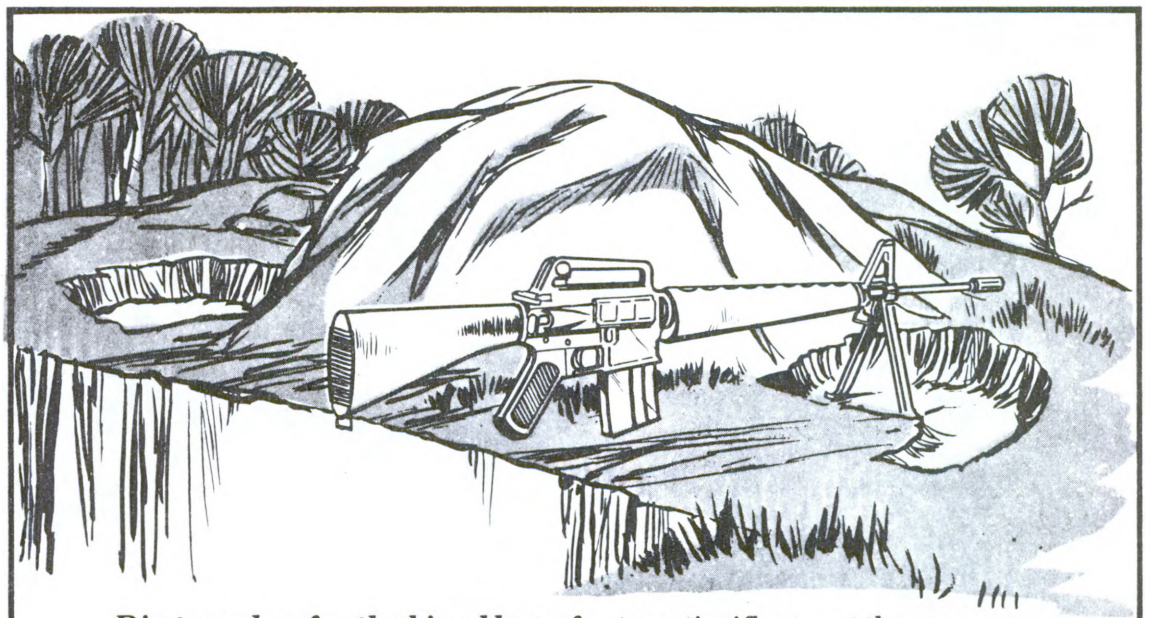


Place ***AIMING STAKES*** toward especially dangerous approaches so you can lay your weapon on these approaches even at night.

Place ***LIMITING STAKES*** right and left, to define your sector of fire; they will also prevent accidental firing into adjacent positions.

NOTE:

Care must be taken not to destroy the concealment of the position with limiting stakes.



Dig trenches for the bipod legs of automatic rifles to get the weapon as close to ground level as possible.

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VARIATIONS OF THE BASIC POSITION

One-man fighting positions.

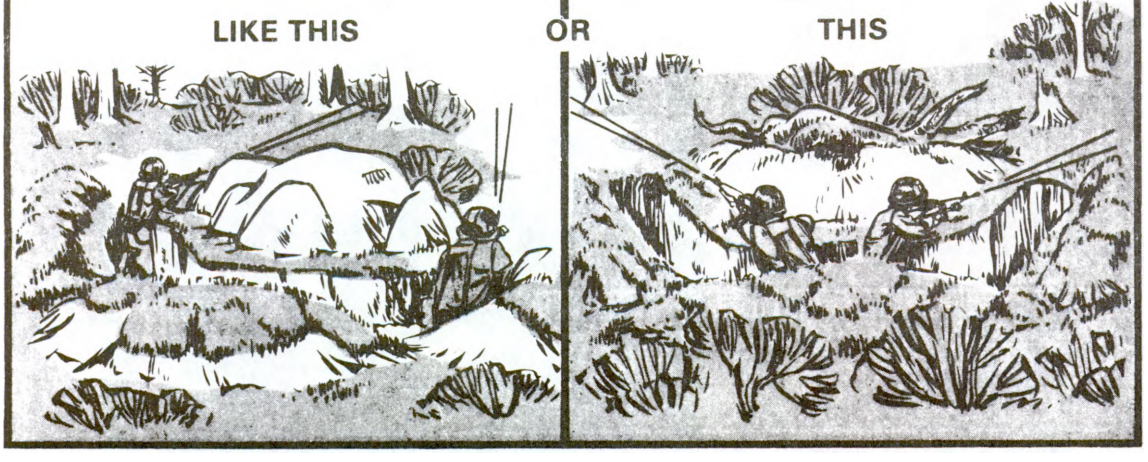
A one-man fighting position can be constructed. This position provides greater flexibility in the use of natural protection because the hole only has to be long enough for one man and his equipment. However, it does not offer the security of a two-man position.

The soldier still has the ability to engage targets to his direct front or to the oblique from behind frontal protection.

Modified two-man position.

You will not always be able to fight effectively from the rectangular hole. In rugged terrain where grazing fire and mutual support are limited to the adjacent position, or in order to cover dead space immediately in front of the position, the hole may have to be modified. You can do that by extending one or both ends of the hole along the sides of the frontal protection.

LIKE THIS OR THIS



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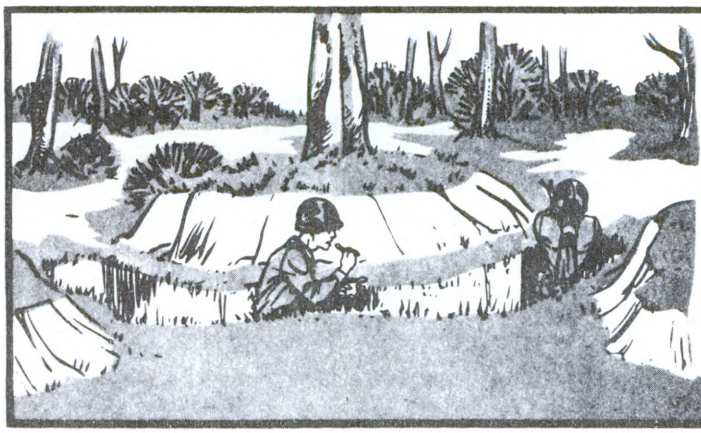
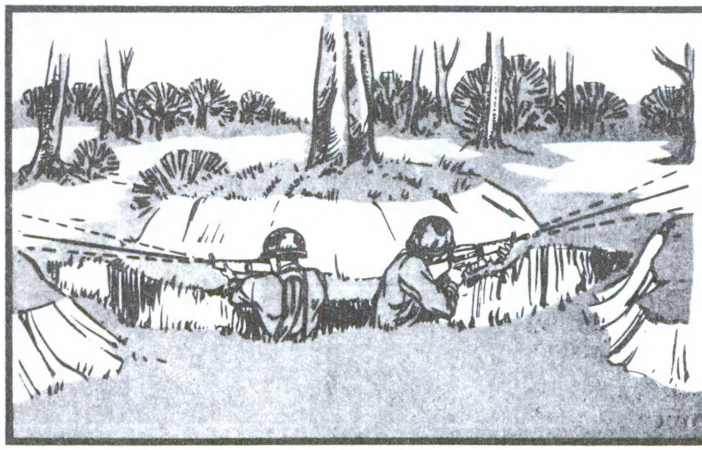


Modifying the hole this way will allow each soldier maximum observation and fields of fire to the front. This is also an advantage during rest or sleep periods since one soldier can observe the entire sector of fire while the other rests.



If they receive effective fire from the front, the men can move back to gain the protection of the frontal cover.

By moving about one meter, they can continue to select and engage targets to the front during lulls in the enemy fire.

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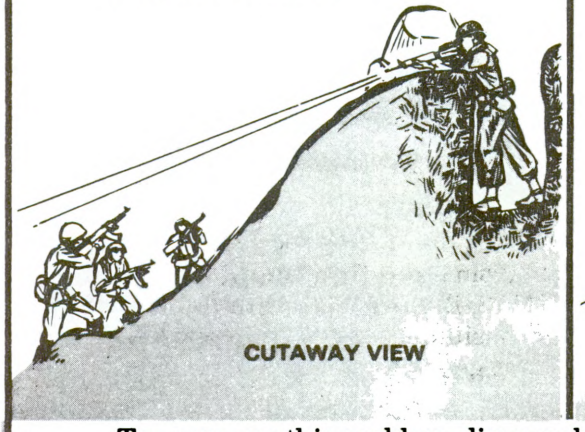
POSITIONS ON STEEP TERRAIN

When building positions on steep terrain, you cannot simply dig a hole behind frontal protection because you would not be able to fire at the enemy without standing up.

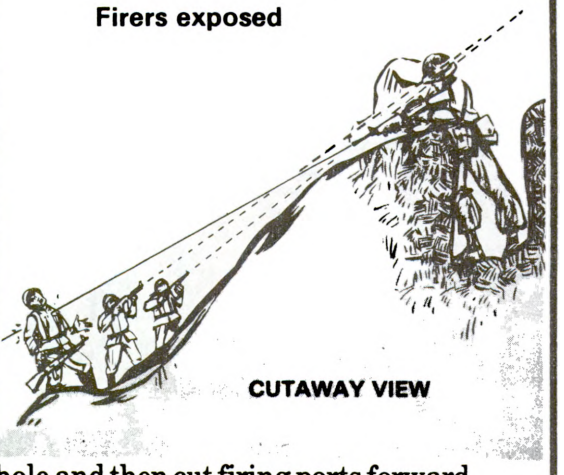
NOT THIS . . .

Fires not effective



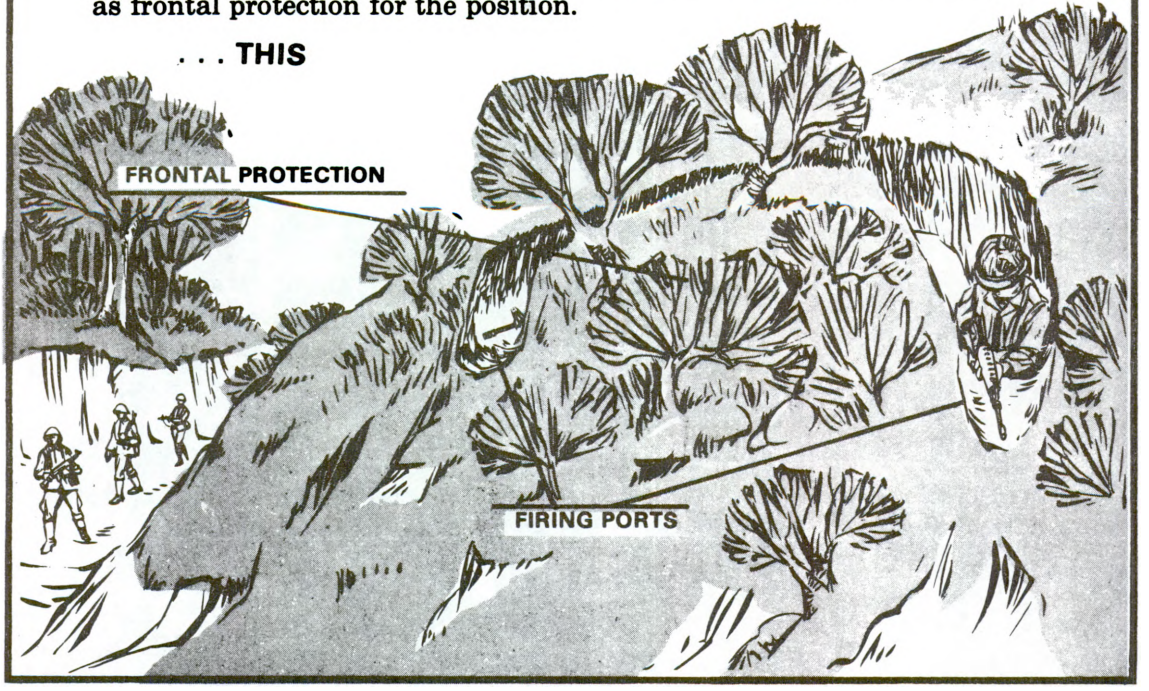
. . . OR THIS

Firers exposed



To overcome this problem, dig your hole and then cut firing ports forward from each end of the hole. The ground between the firing ports then serves as frontal protection for the position.

. . . THIS



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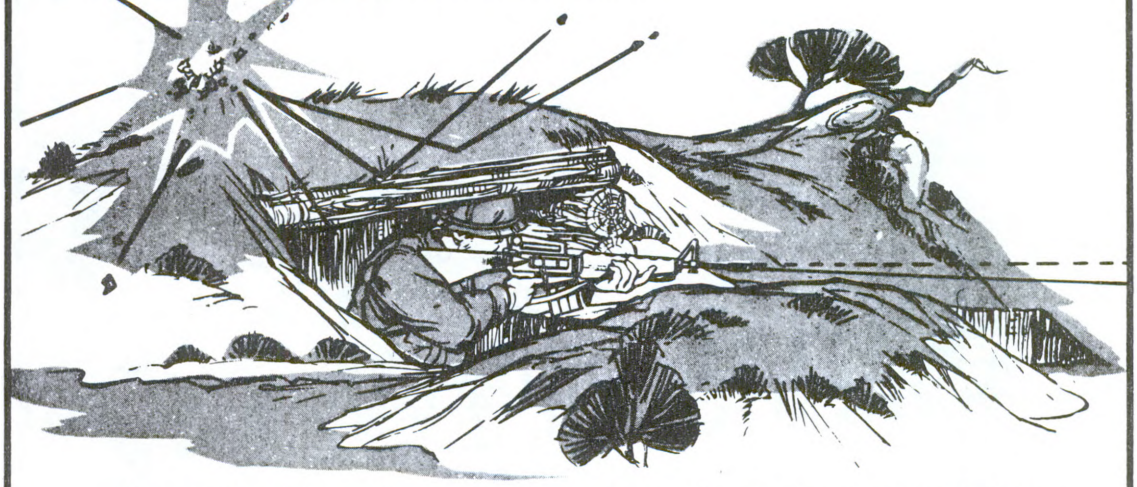
CONSTRUCTING OVERHEAD COVER

Frontal protection, the hole, and the parapet offer the soldier some degree of protection against indirect fire fragmentation. However, overhead cover should be constructed to provide the best possible protection, especially from airbursts. As stated earlier, a good position will have overhead cover that allows you to fight from underneath it.



Support for this overhead cover is contructed by placing 4- to 6-inch (10 to 15 cm) logs on top of each other along the entire length of the front and rear protection. This provides reinforcement for the base.

NOTE:

The front supports are high enough to allow the firers to shoot from underneath.

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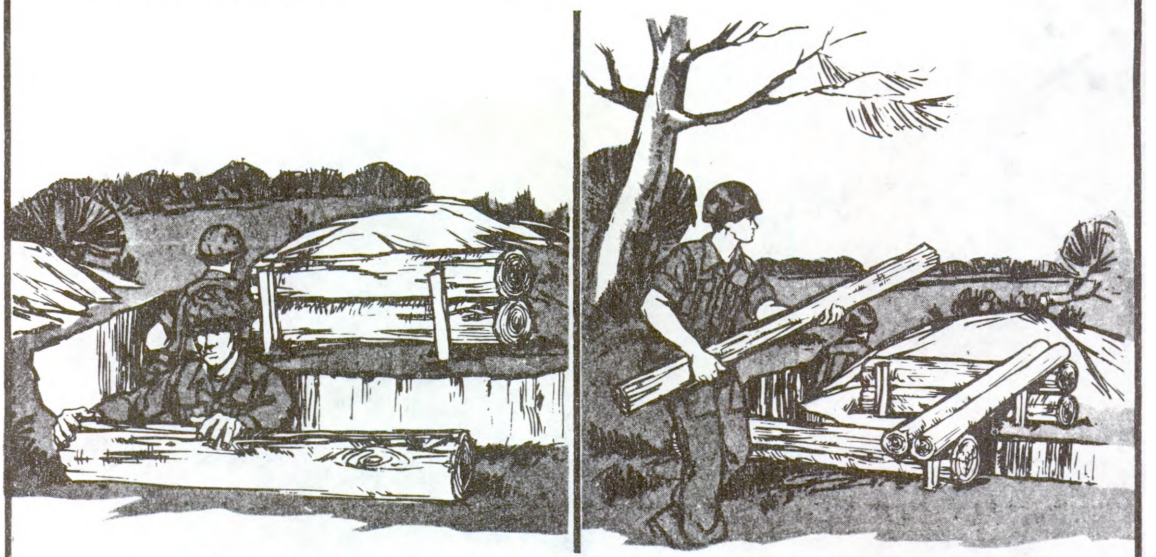
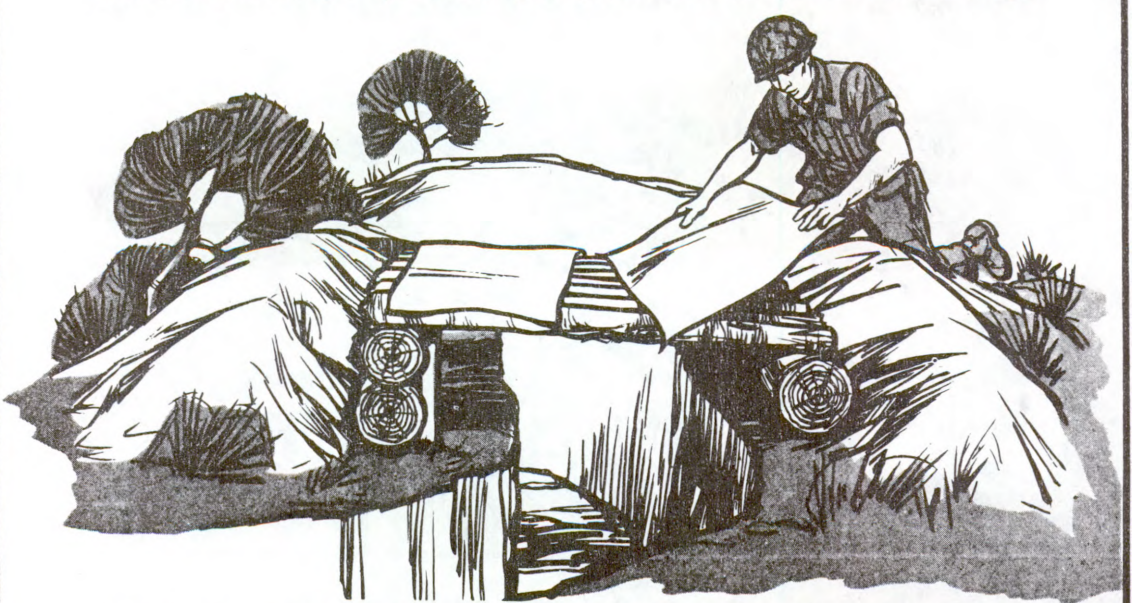
The base consists of 4- to 6-inch (10 to 15 cm) logs placed side by side across the support.



A waterproof or water repellent layer such as waterproof packing material from Dragons, C-rations, or a poncho is then placed over the logs.



6-8 inches (15-20 cm) of dirt is added and molded to blend as much as possible with the slope of the terrain.

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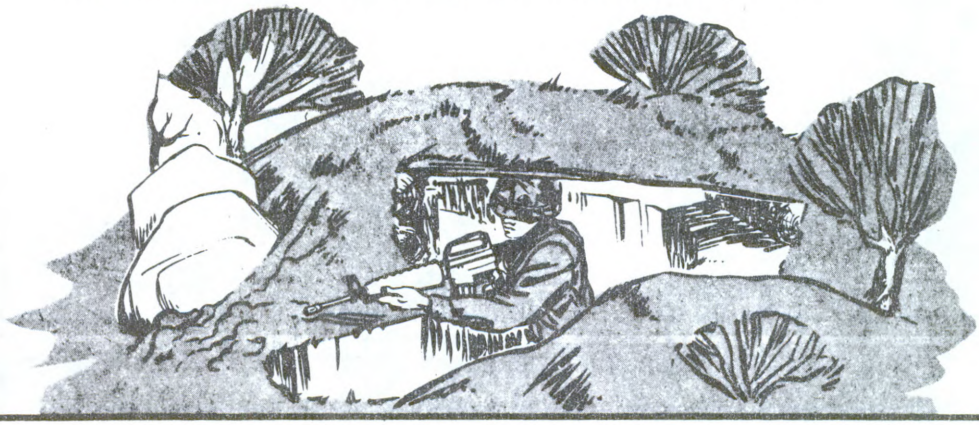
Finally, natural camouflage is applied to conceal the overhead cover. When completed the soldier will have protection against indirect fire fragmentation while still being able to engage the enemy.



When the fighting overhead cover would significantly increase the silhouette of the position making it vulnerable to detection, flank overhead cover should be used.

1

Dig out to a depth of about 12 inches (30 cm), saving the sod for camouflage.

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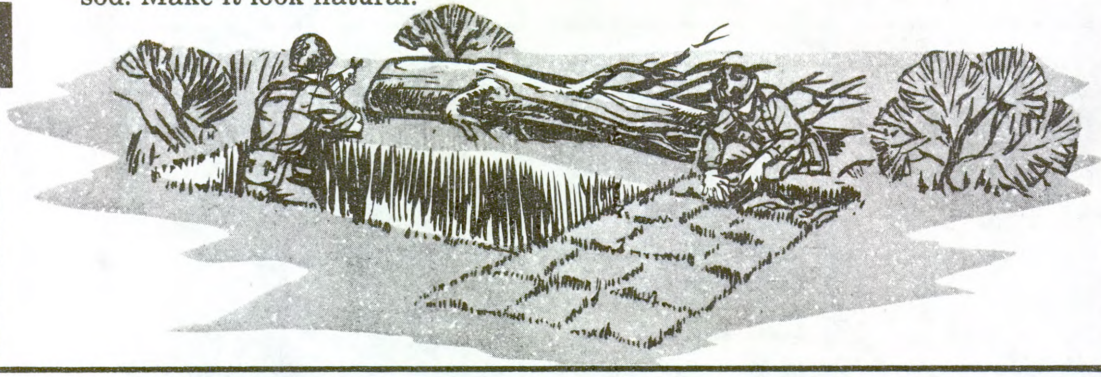
2

Next put supporting logs, planks, or whatever is available across the area to support the rest of the overhead cover material.

3

Fill up the hole, piling dirt on top of the log cover and camouflaging it with sod. Make it look natural.



4

Then get in your hole and dig out a cave-like compartment under the cover.

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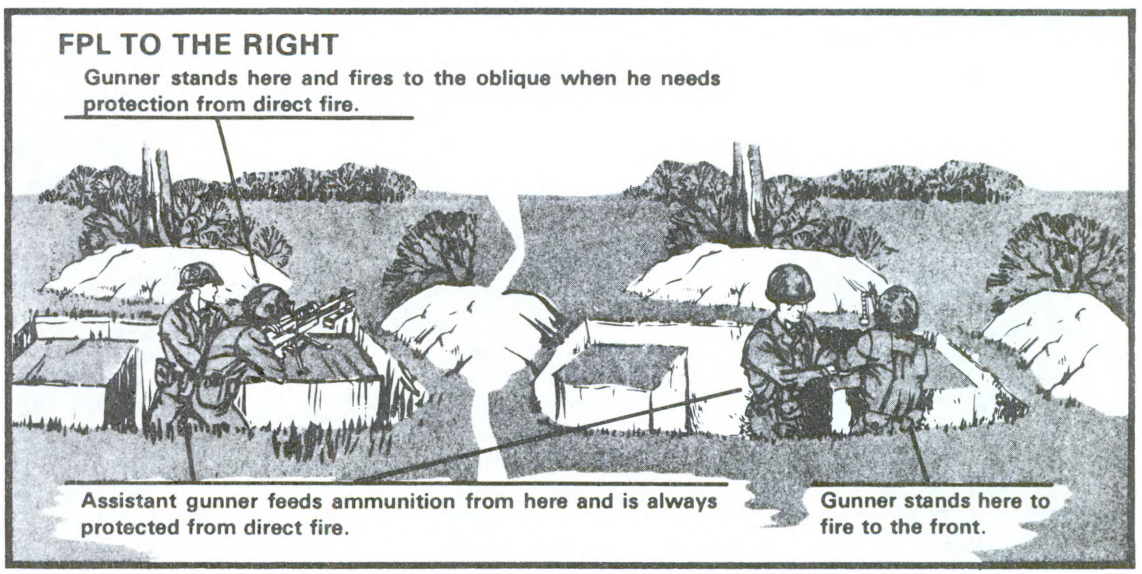
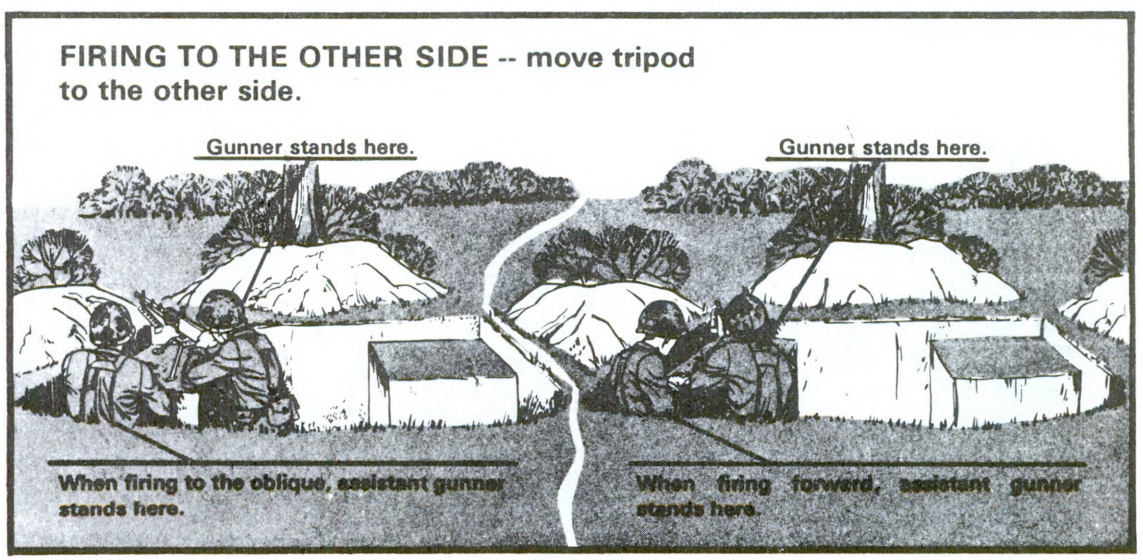
MACHINEGUN POSITIONS

Fighting positions for machineguns may also be constructed so that the gun can fire both to the front and to the oblique. However, it takes two men to keep the gun firing. This means that the hole must be shaped so that both men (gunner and assistant gunner) can get to the gun and the gun can fire to either side of the frontal protection. In order to fire straight ahead, the gunner releases the T & E mechanism from the tripod.


FPL TO THE RIGHT
Gunner stands here and fires to the oblique when he needs protection from direct fire.
Assistant gunner feeds ammunition from here and is always protected from direct fire.
Gunner stands here to fire to the front.


FIRING TO THE OTHER SIDE -- move tripod to the other side.
Gunner stands here.
Gunner stands here.
When firing to the oblique, assistant gunner stands here.
When firing forward, assistant gunner stands here.

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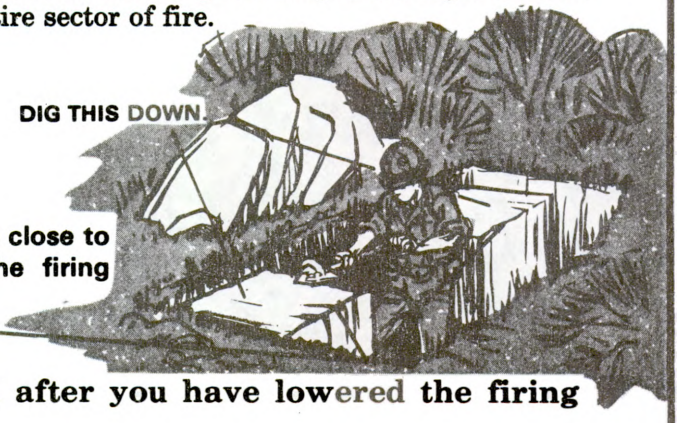
HOW TO PREPARE A MACHINEGUN POSITION

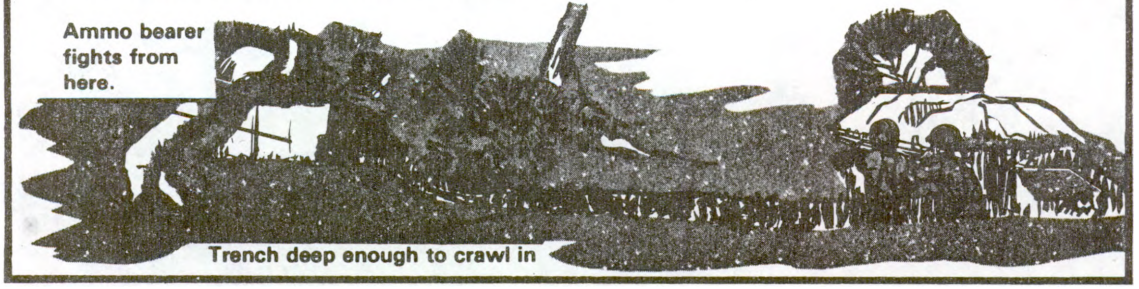
The platoon leader will tell you exactly where to put the gun, give you a sector of fire, and assign you a final protective line (FPL) or principal direction of fire (PDF). Position the tripod so that the gun can be laid on the FPL or PDF and the crew is behind the frontal protection. When the tripod is in place so that you can fire the FPL, mark where you are going to dig the tripod table, move the gun to the other side of the position, and do the same. You can then decide exactly how you must dig the hole.

After digging the hole, reduce the height of the gun by digging down the tripod platform as much as you can. Don't dig it so deep that the gun cannot be traversed across your entire sector of fire.



Make your range card after you have lowered the firing platform.

When you have a three-man crew for the machinegun, have the ammunition bearer prepare a one-man fighting position so that he can observe and fire to the front and secondary sectors of fire of the machinegun. This means that the ammunition bearer's position should be on the same side as the FPL of the machinegun so that he can protect the immediate front of the position. Connect his position to the gun with a crawling-depth trench so that he can bring over ammunition or replace one of the men on the gun as necessary.



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APPENDIX E

EMPLOYMENT OF OBSERVATION POSTS

1. SELECTION. Observation posts (OPs) are positions occupied to observe (and listen to) enemy activity within a particular sector and provide early warning of an enemy approach. The site selected for the observation post should:

a. Provide good observation of the desired area or avenue of approach.

b. Provide good cover and concealment. Good observation of the assigned sector may require less cover and concealment than normally desired.

c. Have covered and concealed routes to and from the position. You should be able to get into and leave the OP without being seen.

d. Not attract the enemy's attention by having a water tower, an isolated grove of trees, a single tree or building, or abandoned equipment.

e. Not skyline the observers. Avoid hilltops. You are usually better off farther down the slope of a hill or on a flank of a building, etc.

2. PERSONNEL AND COMMUNICATION. The observation post should be manned by at least two soldiers. Additional men may be required if OP personnel cannot be rotated regularly. Personnel selected for the OP should be reliable and know how to call for and adjust artillery fires. Binoculars and compasses should also be provided. The unit commander must also decide how to maintain communication with the OP. The preferred method is to utilize the TA-312 field telephone. Other alternatives include radios (if available) or messenger. If the OP is equipped with a telephone, conceal the wire in grass and other vegetation. If a wire break is suspected once it has been installed, never send one man to check it. You should always send two men, one to find the cut and repair it, the other to overwatch him. Often, the enemy will try to take prisoners by cutting a line and lying in wait. If there is a high probability of the unit receiving enemy artillery fire, then the OP must have overhead cover. The OP will attempt to make as little noise as possible. Since the TA-312 has no visual indicator (cat eye) to indicate an incoming call, and the buzzer volume knob will be set at the minimum level, a standing operating procedure (SOP) should be established so that the OP originates all calls into a switchboard. Situation reports should be required to verify the alertness of the OP periodically.

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3. PLACEMENT. Normally, the guidance on placement of OPs is that they are within small arms range of the unit's main defensive position. The ideal situation is that the OP be located far enough out so that the enemy can be detected before he has located the unit. For a maintenance unit, this can create problems due to the amount of noise that can be generated during normal operations. The unit commander may have to place the OP out farther, reducing the amount of fire support available for it, to increase his unit security. A method of determining the effectiveness of the unit's OP locations is to conduct a reconnaissance of the unit's position with the OPs in place and the normal maintenance activity under way. If the enemy can detect the unit position before the OP spots them, or if the unit does not have enough reaction time, the OP will have to be relocated.

4. SPECIAL SITUATIONS. When the unit is located in urbanized terrain (villages, towns, cities), OPs should be located outside and forward of the buildings. The number of OPs may have to be increased to provide adequate coverage. In large cities, vehicular check points/dismount points may also be established to control traffic in the unit area.

References: FM 7-7, The Mechanized Infantry Platoon and Squad.
TC 7-1, The Rifle Squad.

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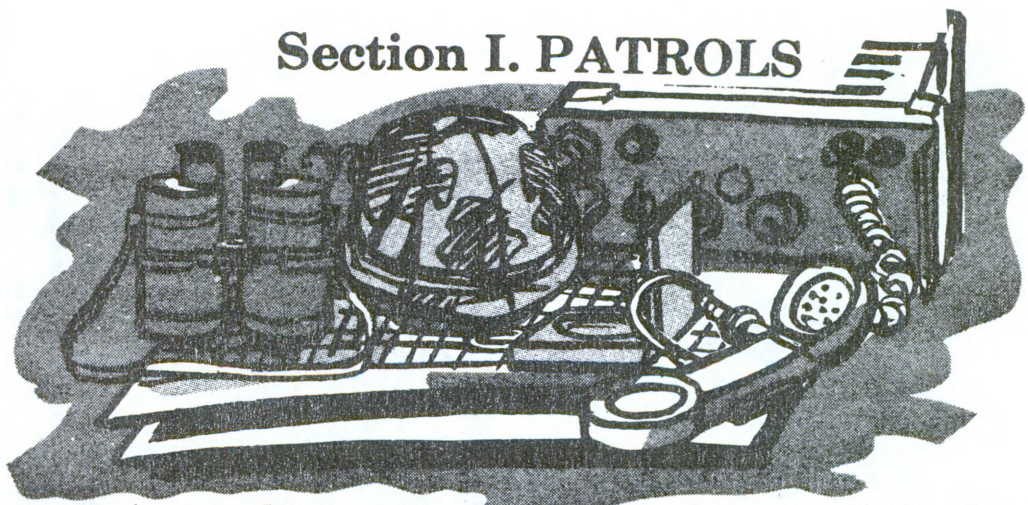
APPENDIX F

PATROLS

Section I. PATROLS



A patrol is a unit sent out by a larger unit for the purpose of carrying out a combat or reconnaissance mission. A patrol can be as small as a fire team, or as large as a company. A unit may be modified as necessary to get the job done. If necessary, fire teams can be attached to squads to form reinforced squads. The patrol can consist of two squads under one leader, or one squad can be detached to form a platoon-minus.

For a particular mission, individuals with needed skills can be attached to the patrol. These can be scout dog handlers, interpreters, medics, demolitions experts, forward observers, intelligence analysts, or communications specialists.

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The planned actions on the objective area determine the type patrol which is conducted:

PATROLS FALL INTO TWO GENERAL CATEGORIES

1

RECONNAISSANCE PATROLS

- Point Reconnaissance
- Area Reconnaissance

COMBAT PATROLS

2

- Contact Patrols
- Raids
- Ambush Patrols

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CHARACTERISTICS OF PATROLLING MISSIONS

A patrolling mission is in some ways different from a conventional mission.

REQUIRES INDEPENDENT OR SEMI- INDEPENDENT ACTION

A patrol mission may take the squad away from the direct overwatch of the platoon on which it can rely for support. The patrolling squad may have some limited fire support, but it is more or less on its own. It must be self-sufficient. If and when it does become engaged, it must rely upon its own resources and must either defeat the enemy or disengage. Reinforcement will normally not be possible.

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REQUIRES DETAILED PLANNING

Patrolling missions require detailed and well-thought-out plans. The mission must be analyzed in great detail. Thorough reconnaissance is desired. Nothing is left to chance. Alternate plans and contingencies must be developed and coordinated. Each soldier must know exactly what he is to do. Each piece of equipment must be inspected.

MAY REQUIRE TASK ORGANIZATION AND SPECIAL EQUIPMENT

When patrolling missions are planned, the patrol leader must consider all possibilities. The squad may need to carry special equipment or weapons. The leader must keep in mind that the patrol should be kept as small as possible to avoid detection. He should take only the number of men required consistent with unit integrity. A buddy team is normally the smallest grouping that is given a task. However, as a general rule, missions are not assigned below fire team level. A man would not be taken on patrol if he might compromise the mission -- such as a man with a cold who may cough or a man not able to keep up.

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REQUIRES REHEARSALS

Since a patrolling mission may require the attachment of men who are not used to working with the unit, and because of the need for exact timing, **rehearsals are essential.** Units must rehearse every detail of their mission when time is available, to insure that their plans are executed with precision.

REQUIRES STEALTH

In patrolling operations a unit acheives surprise through stealth. A combat patrol must move undetected until it is close enough to its objective to insure that it can destroy the resistance, complete the mission, and depart the area before reinforcements can be brought in by the enemy. During reconnaissance missions, the unit makes every effort to complete the mission totally undetected by the enemy. For the mech squad that is on a mounted patrol, this means that it **must** use the terrain driving rules.

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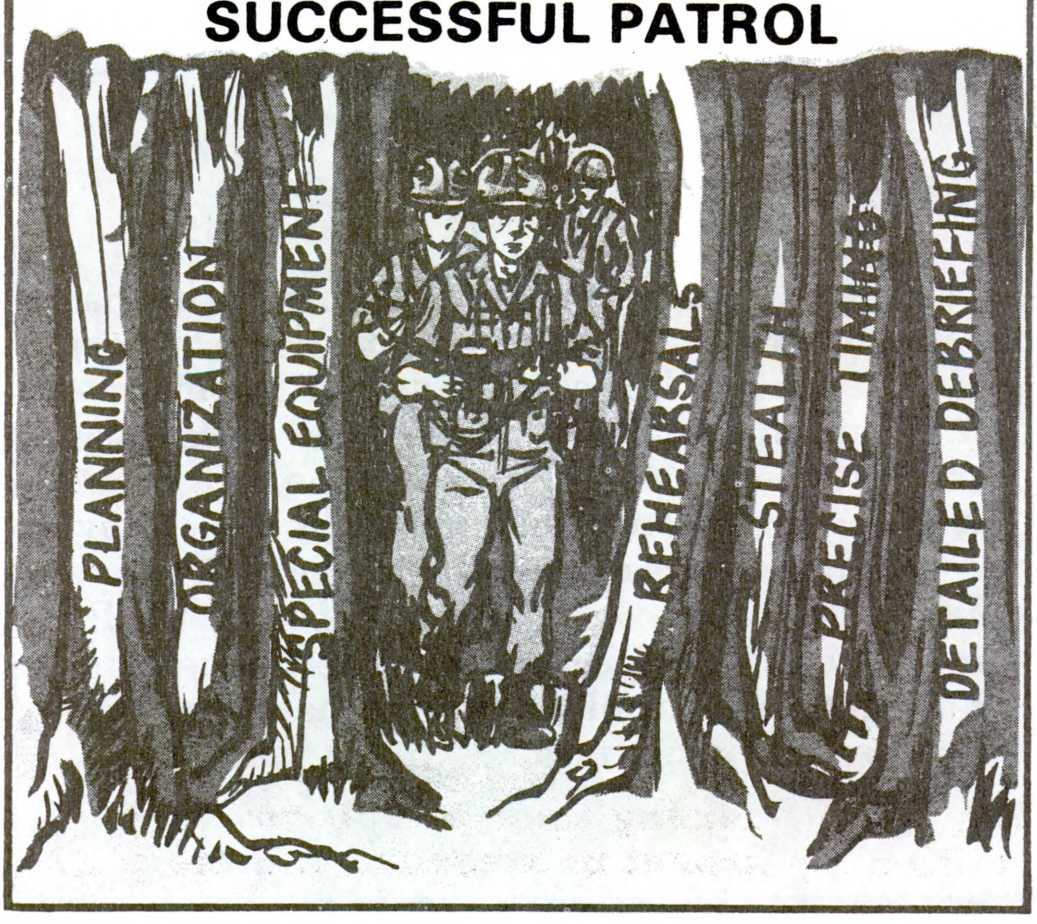
REQUIRES DETAILED DEBRIEFING

All patrolling units have a mission of gathering information. Every unit conducting patrolling missions should assign individuals to take notes and draw sketches of things they observe. The unit should be constantly aware of any changes in enemy weapons, equipment, or tactics. By debriefing, intelligence personnel can help devise better ways to defeat the enemy.



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COMMON TASKS FOR ALL PATROLS

During all patrols there are some basic tasks which must be accomplished.

TASK ORGANIZING

When he receives the patrol mission, the patrol leader organizes his men and equipment based upon the tasks that have to be performed at the objective. He assigns one or more missions to each subordinate team within the patrol. For instance, in a squad-size combat patrol with a raid mission, one team may have the mission of providing security and providing supporting fire to the team assaulting the objective. Men in the squad may have to be taken from one team and placed in another if it is necessary to accomplish the mission.

MISSION
ENEMY
TERRAIN
TROOPS

The patrol leader must task organize based on what must be accomplished. In addition to organizing the squad, consider specialized equipment or weapons and the men needed to operate them.

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PATROL ORDER

The patrol order is issued in much the same way as any other operation order. If it is a squad size patrol, the platoon leader gives detailed instructions to the squad leader. He will not break down the duties into separate parts for elements, teams, and individuals. He will give all of the duties that pertain to the squad when he gives the squad's mission. For instance, he may give the squad the mission of assault and also give it the responsibility of emplacing demolitions, searching, etc. The squad leader then assigns the men to do it. The squad leader assigns the individual tasks or the tasks that require less than a fire team. The entire squad should be present when the squad leader gives his order.

In addition to standard operation order items, the patrol leader covers the following in his order:

- **PRIMARY AND ALTERNATE ROUTES.**
- **DEPARTURE AND REENTRY OF FRIENDLY AREAS.**
- **ACTION IN DANGER AREAS.**
- **ACTIONS ON CONTACT.**
- **RALLY POINTS.**
- **ACTIONS ON THE OBJECTIVE AREAS.**

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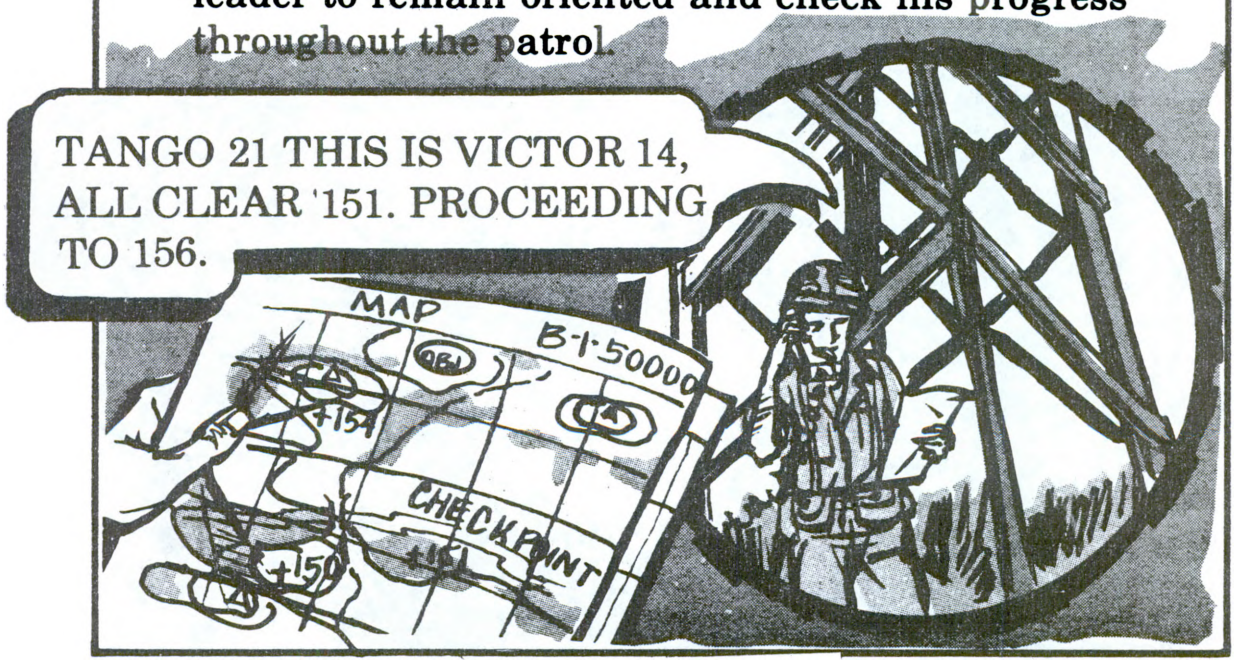
MOVEMENT

In patrolling, the unit moves using the same basic movement techniques discussed in chapters 4 and 5. However, the patrol wants to avoid contact unless it is according to the plan. The patrol's mission could be compromised by premature or unexpected contact. Lead elements seek the enemy's location and avoid contact. If contact is established, the emphasis is on breaking contact unless the patrol has been detected and the enemy is so weak that the squad can destroy him readily.

ROUTE SELECTION AND PLANNING

The patrol leader selects a primary and at least one alternate route to and from the patrol objective. Each route is divided into legs or sections which start and end at a recognizable terrain feature. This technique enables the patrol leader to remain oriented and check his progress throughout the patrol.



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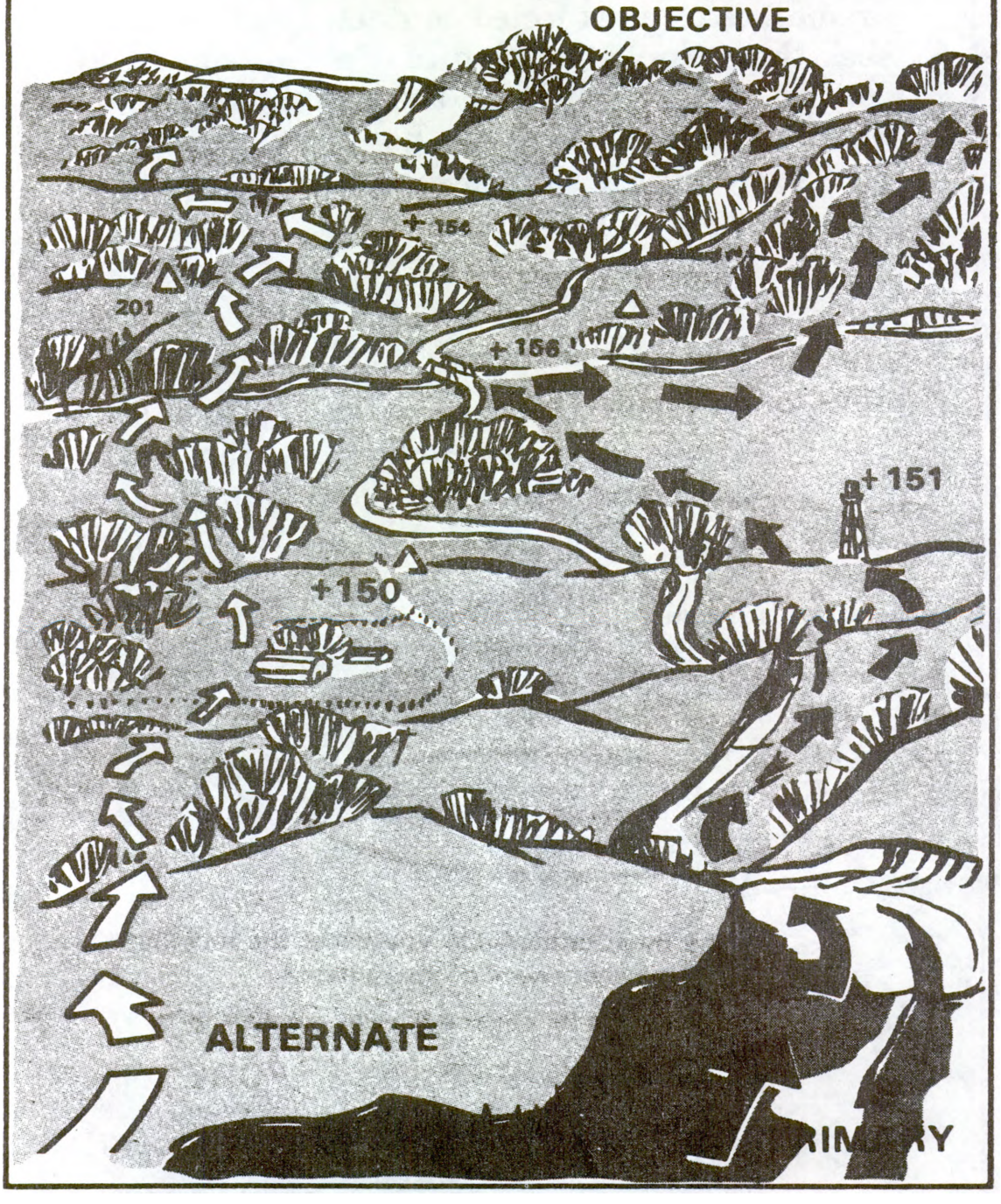
When terrain permits, the legs may be on a compass azimuth and paced off during the patrol. Enemy STANO devices and the requirement to use covered and concealed routes will normally prohibit movement on a direct compass azimuth.



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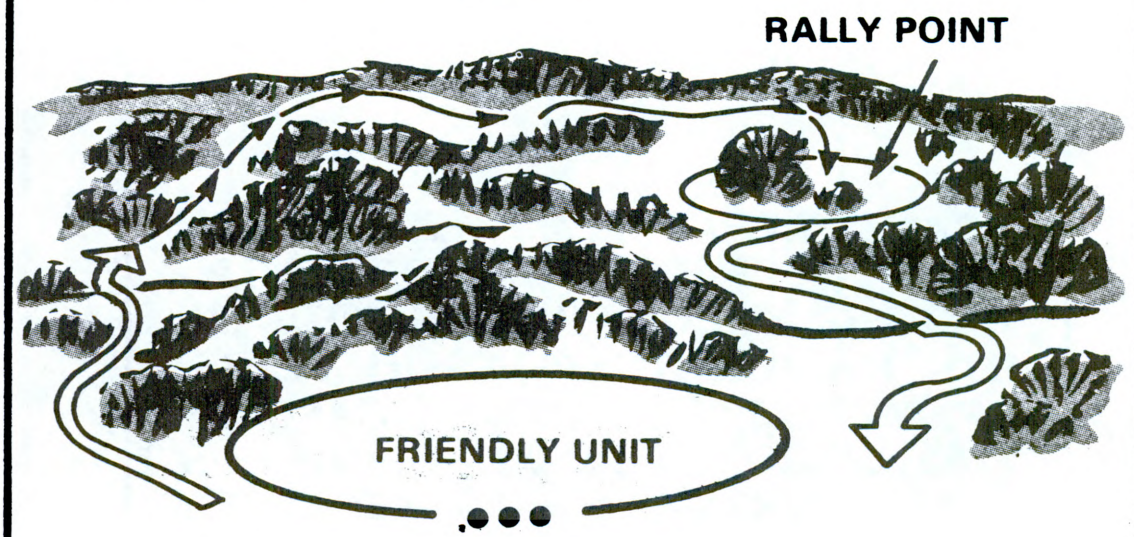
DEPARTURE AND REENTRY OF FRIENDLY LINES

The movement through friendly lines is one of the most critical parts of the patrol. The patrol leader is normally given points of departure and reentry of friendly lines. He is also given a time for departure and reentry. The patrol leader must insure complete coordination is made at the exit and reentry points to include arranging for guides through obstacles, code words, radio frequencies, and recognition signals. The patrol leader must arrange to verify every member of a returning patrol to insure there are no enemy infiltrators. Normally during reentry, the patrol will stop at a rally point in enemy territory and contact friendly units and receive clearance before attempting to move to the reentry point.



Reentry is the most critical. Do you know the recognition signal? Are the friendlies aware of your intent?

The rally point should be beyond friendly small-arms range.

COORDINATE FOR REENTRY BEFORE YOU DEPART!

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DANGER AREAS

When moving to the objective, a leader must plan to avoid those areas where the likelihood of contact or discovery by the enemy will occur. Because contact or discovery will jeopardize their mission, patrol leaders designate such areas as danger areas. There are times when these areas cannot be avoided. When this occurs special techniques are required.

Typical danger areas are:

- highways
- streams
- large open areas
- known enemy positions

FACING THE ENEMY, THE RECONNAISSANCE DETACHMENT COMMANDER BECOMES CONSCIOUS OF HIS HEAVY RESPONSIBILITIES. EVERY MISTAKE MEANS CASUALTIES, PERHAPS THE LIVES OF HIS MEN. THEREFORE, ANY ADVANCE MUST BE MADE WITH EXTREME CAUTION AND DELIBERATION.

ROMMEL

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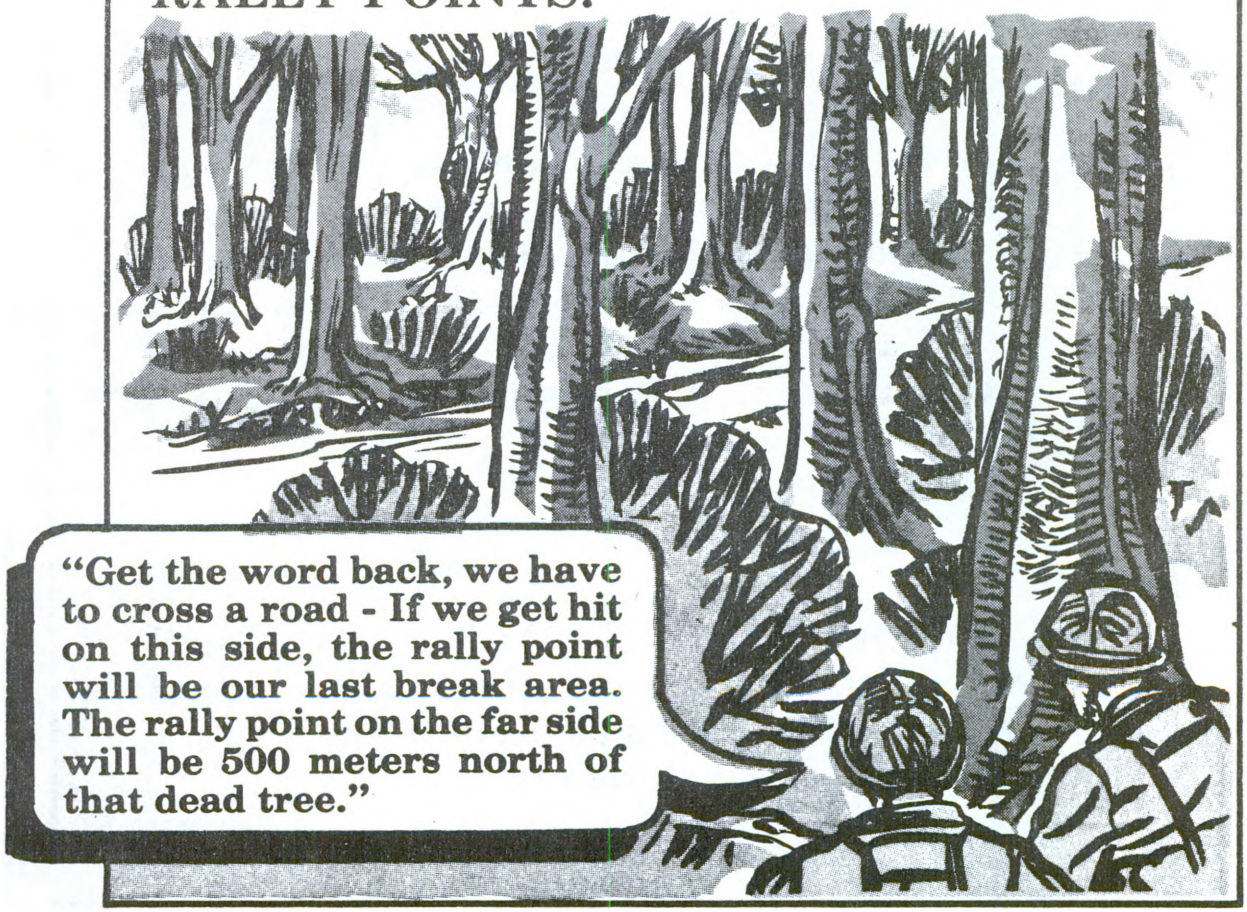
Use the following techniques in conjunction with bounding overwatch. Portions of the lead element may physically secure the flanks and have the remainder of the patrol pass through them to the far side. Depending on the area, the patrol may cross by infiltrating fire teams, and link up at a rally point beyond the area.

Each danger area is different and may have to be crossed differently. There is no one solution for crossing danger areas. There are many different techniques. However, there are certain basic points to remember:

DESIGNATE NEAR AND FAR SIDE RALLY POINTS.


"Get the word back, we have to cross a road - If we get hit on this side, the rally point will be our last break area. The rally point on the far side will be 500 meters north of that dead tree."

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... **AND** in the following order:

1. **SECURE THE NEAR SIDE.**
2. **SECURE THE FLANKS.**
3. **SECURE THE FAR SIDE.**
4. **CROSS THE DANGER AREA.**

Reconnoitering and securing the near side may involve nothing more than a visual observation. It may also involve actual physical security being placed out at a distance to either side of the crossing point to give early warning of enemy approach.

When conducting the patrol mounted, the patrol leader should stop short of the danger area and dismount as many men as necessary to accomplish the steps listed above.

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ACTIONS ON CONTACT EN ROUTE

WHEN THE PATROL MAKES UNEXPECTED CONTACT, IT MUST BE PREPARED TO QUICKLY BREAK CONTACT AND CONTINUE THE MISSION.

IMMEDIATE ACTION DRILLS are established by the patrol leader based on the mission, enemy, and terrain. They may be SOP in the unit or established for a single patrol. Every area and enemy require different action, therefore, there is no universal set of drills. Immediate action drills normally include actions for breaking contact and for reacting to ambushes.

RALLY POINTS are used along the patrol route to reassemble the patrol if it becomes dispersed. Rally points are selected on the near and far sides of danger areas. Additional rally points may be selected along the route as required or designated during the patrol. The patrol leader must state the action to be taken at rally points. During the patrol, additional instructions are issued. Each man must know the rally point in case the patrol becomes dispersed. Normally, instructions provide for continuing the patrol after a certain number of men arrive at the rally point or after a certain period of time. The senior man at the rally point will, in the absence of the patrol leader, decide how to best accomplish the mission.

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DETAILED INSTRUCTIONS FOR ACTIONS ON THE OBJECTIVE AREA

For each type patrol, detailed instructions are given for actions on the objective area, to cover at least the following:

- ☑ **OCCUPATION AND SECURITY OF THE OBJECTIVE RALLY POINT**
- ☑ **CONDUCT OF THE LEADER'S RECONNAISSANCE**
- ☑ **FINAL CHECKS ON EQUIPMENT AND PERSONNEL, AND ADJUSTMENT TO PLANS**
- ☑ **INITIAL POSITIONING OF ELEMENTS OF THE PATROL TO ACCOMPLISH THEIR MISSIONS**
- ☑ **FIRE SUPPORT**
- ☑ **SIGNALS**
- ☑ **ACTIONS AFTER EXECUTION OF MISSION**
- ☑ **DISSEMINATION OF INFORMATION GAINED ON THE OBJECTIVE TO ALL PATROL MEMBERS**

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RECONNAISSANCE PATROLS

A point or area reconnaissance patrol is a common fire team or squad mission. Mechanized infantry units may move to the objective area mounted or dismounted or conduct the entire mission mounted, depending on the situation and mission.

POINT RECONNAISSANCE

The patrol is halted and concealed near the objective, usually at the objective rally point. The leader reconnoiters to confirm location of the objective, plans for positioning the teams, and plans for accomplishing the mission. Security teams, when used, are positioned so that they can secure the objective rally point, provide early warning of enemy approach, protect the reconnaissance element, or any combination of these tasks. The reconnaissance element then reconnoiters the objective. This is done by the method best suited to the terrain, the layout of the objective, and the requirements of the mission. When the reconnaissance is completed, all information gained is disseminated to all patrol members. A preliminary report is made if radio contact is possible. A full report is made as early as possible.

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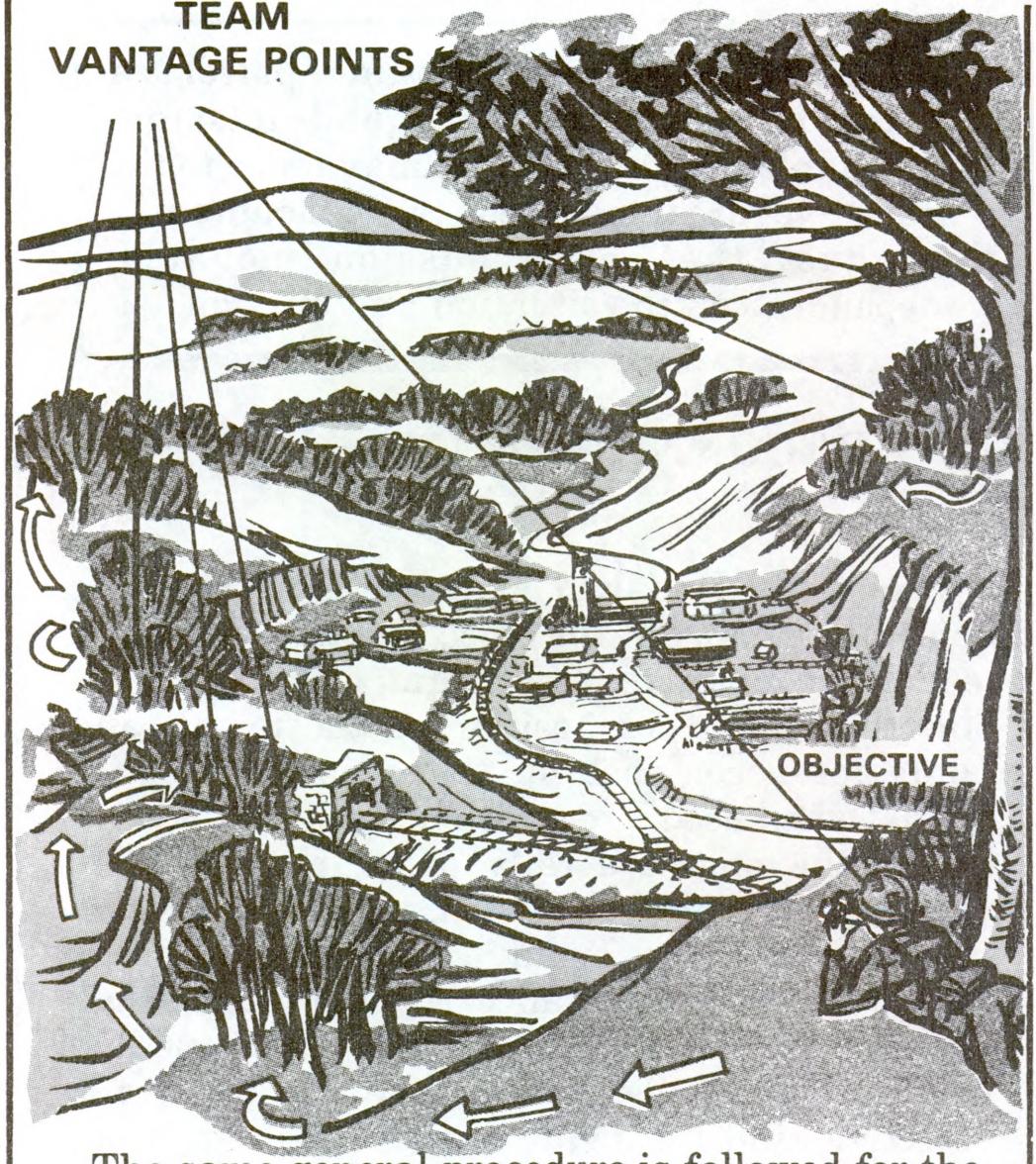
POINT SURVEILLANCE



The same general procedure is followed for the conduct of point surveillance. In surveillance, however, teams are positioned at vantage points near or around the objective and observe for required periods, moving from position to position as required to accomplish the mission.

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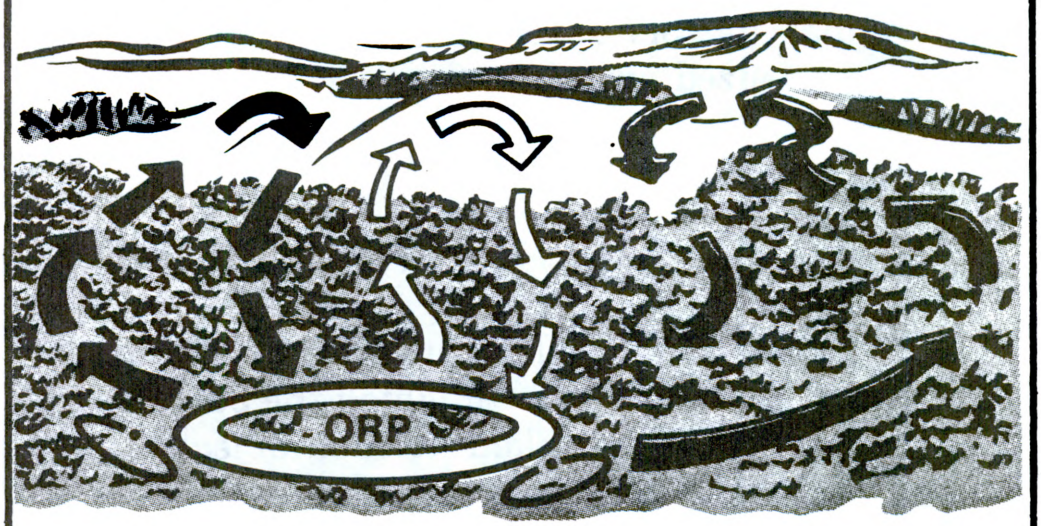
AREA RECONNAISSANCE



The leader's reconnaissance is conducted, security teams are positioned, and reconnaissance teams sent out as in a point reconnaissance mission. When the entire patrol is used to reconnoiter the area, each team performs both reconnaissance and security missions. When teams are not to return to the objective rally point, they assemble at some other designated rally point. This method of assembly might be used when teams must avoid moving through an area twice or when the objective is approached from the rear.

AREA SURVEILLANCE

This is conducted in the same manner as point surveillance, differing only in that multiple teams are required and an extended area, rather than a point, is kept under surveillance.

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COMBAT PATROLS

The squad may conduct various types of combat patrols or participate as part of a platoon-sized patrol.

PATROLS FOR LOCAL SECURITY

The patrol leader selects a series of objectives covering the area in or over which the patrol is to move. Actions to be taken at each objective are planned, based on available information. This is done in the same manner that actions at danger areas are planned. The patrol leader must be alert to modify his plans if the situation at an objective is not as anticipated.

As each objective is secured, plans for the next objective are confirmed or modified, and the patrol continues.

A fire team or squad may conduct this type of a patrol after a "stand to" or first light.

CONTACT PATROLS

A series of objectives is selected just as in a local security patrol. The patrol proceeds from one objective to another until contact with the enemy is established, then acts in accordance with the situation, or as directed.

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PATROLLING CHECKLIST

Unit Leader:

1. Patrols should be small - 3 or 4 men
2. Patrol should have definite areas or route to recon
3. Insure patrols have good leaders
4. Insure to coordinate as necessary with:
   - Perimeter posts for exit and reentry
   - Other units in area
   - Fire support elements

Patrol Leader:

1. Receive Mission
2. Ask Questions:
   - (a) Study Terrain and Weather
   - (b) Study enemy
   - (c) Local Civilian attitude
   - (d) Own Troops
   - (e) Special Equipment
   - (f) Commo - get a portable radio (PRC 77/68)
3. Make a tentative plan
4. Coordinate with others
5. Select men
6. Issue warning order
7. Make a recon
8. Complete the plan
9. Final Coordinating
10. Rehearsal
11. Inspect Patrol Members
12. Conduct the Patrol
13. Report Back

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APPENDIX G

COUNTERSURVEILLANCE AND CAMOUFLAGE TECHNIQUES

1. GENERAL. The threat possesses the capability to detect maintenance units anywhere on the battlefield. If a unit is detected, it can be engaged and, with the lethality of modern weapons, it can be destroyed. It is the responsibility of the company commander to minimize his unit's vulnerability. A maintenance unit does not have a significant active defense, so it must rely on passive measures to reduce its vulnerability. The most significant passive measure a unit can employ for its defense is camouflage and countersurveillance techniques.

2. THREAT. The threat has four surveillance capabilities that can be used to detect our units. They are:

a. Visual - naked eye, conventional photo, some night vision devices (image intensifiers).

b. Infrared - infrared photo, searchlight.

c. Thermal - thermal imaging (some night vision devices).

d. Radar - radar.

3. PRINCIPLES OF COUNTERSURVEILLANCE. To avoid being detected, several principles need to be applied:

a. Identify the Threat. Your battalion S2 can tell you exactly what the enemy's surveillance capabilities are and what patterns of employment exist. This information will help you develop a countersurveillance plan.

b. Avoid Detection by Routine Surveillance. The enemy may not be able to generate additional surveillance capacity if he fails to detect your unit on an initial overpass. The idea is to not give the enemy something to detect in the first place.

c. Blend With Your Environment. For a maintenance unit, it will be difficult to disguise your operations, particularly with vehicles awaiting repair. The best way to apply this principle is to operate in an area where your normal activity will not stand out. The most suitable areas are small towns, villages, or cities where there are existing maintenance facilities and a multitude of similar vehicles and activities in operation.

d. Minimize Movement. Movement is dangerous because it attracts the eye of the observer. Movement creates noise, dust, and heat -- all of which are detectable.

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e. Treat Night as Day. Darkness by itself is no protection from observation. The same care in maintaining camouflage discipline during the day must be exercised at night.

4. CAMOUFLAGE. A commander tries, by every means available, to prevent the enemy from spotting his unit. To survive, camouflage must be a state of mind, a skill reduced to unconscious habit. Effective camouflage has four elements:

a. Proper siting is the first big step. It reduces the level of visibility and causes a great reduction in further camouflage effort. Proper siting simply means carefully fitting each soldier, each vehicle, each tent, into the natural nooks and crannies of the terrain and foliage. Clever positioning in itself often offers significant cover and usually offers significant camouflage.

b. Pattern painting (with improved paint) reduces the detection range of vehicles by 35%. Pattern painting is most effective in static positions and enhances the psychological level of camouflage among the unit's soldiers. The use of improved camouflage paint protects against infrared detection devices. The key to successful pattern painting is using authorized paints only in prescribed patterns. Failure to do so will negate the effects of pattern painting.

c. The Lightweight Screening System (LSS) further reduces visibility. It also defeats radar by scattering and absorption. TM 5-200 (when published) will have specific information on the use of LSS.

d. Smoke can also be used to protect units from surveillance. It is an active measure, however. In the case of air strikes, it can also have a negative effect through degradation of the unit air defense capabilities (soldiers cannot see attacking aircraft). Also, smoke can identify the unit's location to the pilot unless the whole area is covered.

5. INDIVIDUAL CAMOUFLAGE. As important as unit camouflage is, improper individual camouflage can reveal the whole unit. Our soldiers must know and practice the basic individual camouflage steps.

a. To camouflage exposed skin:

(1) Paint the shiny areas (forehead, cheekbones, nose, and chin) with dark color.

(2) Paint the shadow areas (around the eyes, under the nose, and under the chin) with a light color.

(3) Paint the exposed skin on the back of your neck and hands with irregular patterns.

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(4) When applying camouflage, use the buddy system -- work with another man and check each other.

b. The helmet, load-bearing equipment, and weapons should be camouflaged with burlap garnishing, foliage, charcoal, cloth strips, or mud (if applicable) to break up the color, shape, texture, or shadow of the item.

6. DEFENSIVE POSITION CAMOUFLAGE. Preparation of defensive positions requires that camouflage be used before, during, and after construction.

a. Before construction, the position should be approached from the rear, insuring that a visible trail is not left. Circle the position when moving to the front so that a trail does not point out the position. Do not litter the area, make unnecessary noise, or, during the hours of darkness, expose any light. Do not disturb vegetation not used in constructing or camouflaging the position. Be particularly careful with vehicles to insure that the vehicle does not leave tracks leading to its location.

b. During construction, place the sod from the position in front of the proposed parapet location. Use soil from the hole to build a parapet, then cover it with the sod in such a manner that it looks natural and will have a good chance of growing. Excess soil should be removed and carried well to the rear and hidden so it cannot be seen from the air or ground. If additional vegetation must be used to break up the outline of the parapet, obtain some (similar to that found near your position) from far to the rear of the hole, with root structure intact if possible. Do not use so much vegetation that the position has more than the surrounding area.

c. After construction, replace dying foliage constantly. Change cut foliage at least every 3 hours when the tactical situation permits. If the ground under the weapon's muzzle is dusty, keep it moist.

7. SUMMARY.

a. Eyes are the most numerous and responsive sensors on the battlefield. Camouflage must defeat the eye.

b. Units and individuals that pay attention to the fundamentals -- those for whom CAMOUFLAGE IS A STATE OF MIND -- can avoid detection.

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c. Units that also adhere to requirements for PROPER SITING, have PATTERN PAINTED equipment, use the LIGHTWEIGHT SCREENING SYSTEM, and use SMOKE when an active measure is needed, will increase their chances of avoiding detection.

References: FM 21-2 (Test), Soldier's Manual of Common Tasks.
TRADOC Bulletin 6, Countersurveillance and Camouflage.

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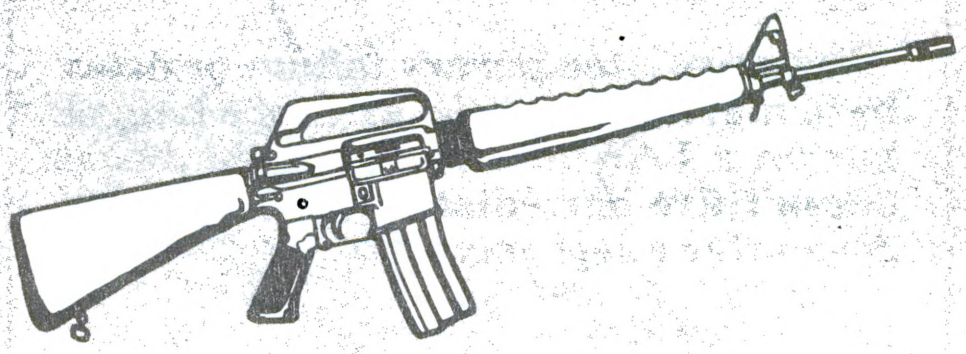
WEAPONS

M16A1 RIFLE



The M16A1 rifle is a caliber 5.56-mm, magazine-fed, gas operated, shoulder fired weapon. It is designed for either semiautomatic or automatic fire through the use of a selector lever. It can be fired from the prone, prone supported, prone bipod supported, kneeling supported, standing and foxhole positions. The firing positions providing the most stability for the rifleman (thereby increasing the probability of target hit) are the prone supported or foxhole supported for semi-automatic fire and the prone bipod supported for automatic fire. The night vision device which is mounted on the M16A1 rifle is the AN/PVS-2. The AN/PVS-2 should be mounted, boresighted, and zeroed on the M16A1 rifle IAW TM 11-5855-203-13 prior to employment at night.

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CHARACTERISTICS

WEIGHT (LOADED) (20-RD MAGAZINE)	**- 7.6 lbs (3.5 kg)**
(30-RD MAGAZINE)	**- 7.9 lbs (3.6 kg)**
LENGTH (W/O BAYONET)	**- 39 in (99cm)**
RANGE AT WHICH A 50-50 CHANCE OF TARGET HIT CAN BE EXPECTED:	
RUNNING TARGET	**- Less than 200m (probability of hit is 0.3 to 0.4)**
STATIONARY TARGET	**- 250m**
MAXIMUM RANGE OF GRAZING FIRE	**- 350m**
MAXIMUM RANGE	**- 2,653m**
CYCLIC RATE OF FIRE	**- 700-850 rds/ minute**
SUSTAINED RATE OF FIRE (SEMI-AUTOMATIC)	**- 12-15 rds/ minute**

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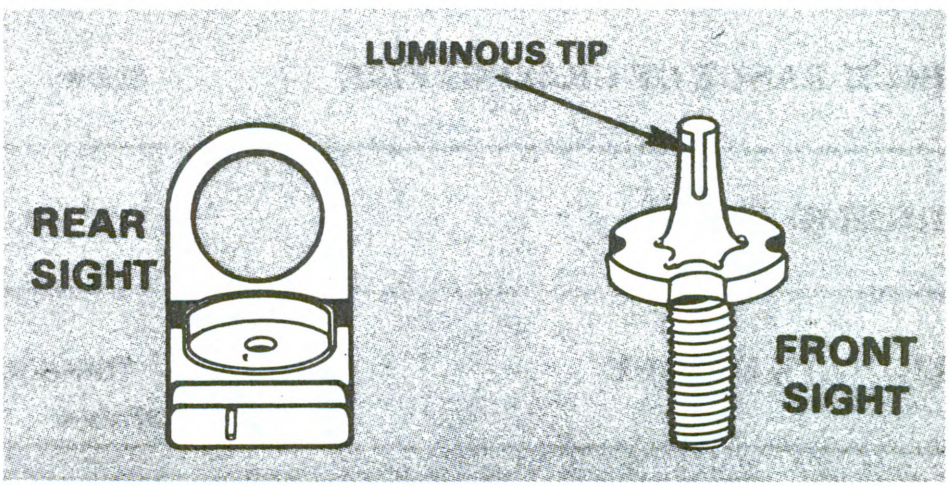
LOW LIGHT LEVEL SIGHT SYSTEM (LLLSS)

The Low Light Level Sight System (LLLSS), commonly called the promethium sight, is a modification of the standard sights on the M16A1 rifle issued to soldiers in infantry units. It is not a night sight. It is designed to allow the rifleman to better obtain sight/alinement during periods of reduced visibility (such as early morning, later evening, or bright starlight or moonlight). During these reduced visibility periods, if a soldier is able to see the target using the standard daylight vision techniques he should be able to aline the Low Light Level Sights and achieve target hit. The sight consists of a split post front sight which contains a vial of luminous material, and a modified rear sight that has a larger aperture.



The use of the promethium sight does not require altering any of the standard firing positions.

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MAGAZINE LOADING

30-round Magazine

The average 30-round magazine will function properly when fully loaded (30 rds). As these magazines are received in a unit, they should be issued first to the automatic rifleman.

20-round Magazine

The 20-round magazine should be loaded with only 16-18 rounds. Loading of additional ammunition may cause damage to the follower spring or jam the follower so that the magazine will not feed the ammunition correctly.

IMMEDIATE ACTION

Immediate action to clear a stoppage with the M16A1 rifle is as follows:

1. **Slap up on the base of the magazine.**
2. **Pull the charging handle to the rear.**
3. **Observe the ejection port for the ejection of a spent cartridge case or live round.**
4. **Release the charging handle, allowing the bolt to go forward.**
5. **Tap the forward assist assembly to insure that the bolt is fully seated.**
6. **Shoot the weapon.**

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CARE AND CLEANING

Cleaning Rifle. **Clean and lightly lubricate with LSA the lugs in barrel extension, bore, and chamber. Clean and lightly lubricate the bolt carrier. Lubricate slide cam pin area, piston rings, outside bolt body, and in bolt carrier key.**

(CAUTION: Apply only a light coat of LSA to firing pin and firing pin recess.)

Use rifle bore cleaning compound (RBC) to clean powder fouling in the upper receiver. Clean outside surface of protruding gas tube with a worn brush. Coat all other surfaces with lubricant. Apply a light coat of LSA to buffer, action spring, and inner surfaces of lower receiver extension. Use generous amount inside lower receiver and on all components.

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Cleaning Magazine. **Wipe dirt from inside magazine, spring, and follower, then lightly lubricate the spring. To maintain spring serviceability do not keep magazine loaded with ammunition over an extended period of time.**

Cleaning Ammunition. **Use a clean, dry cloth to wipe dirt and foreign matter from ammunition. Do not coat with oil.**

REFERENCES

FM 23-9, M16A1 Rifle and Rifle Marksmanship.

FM 23-12, Technique of Fire of the Rifle Squad and Tactical Application.

TM 9-1005-249-10, Operator's Manual, M16A1 Rifle.

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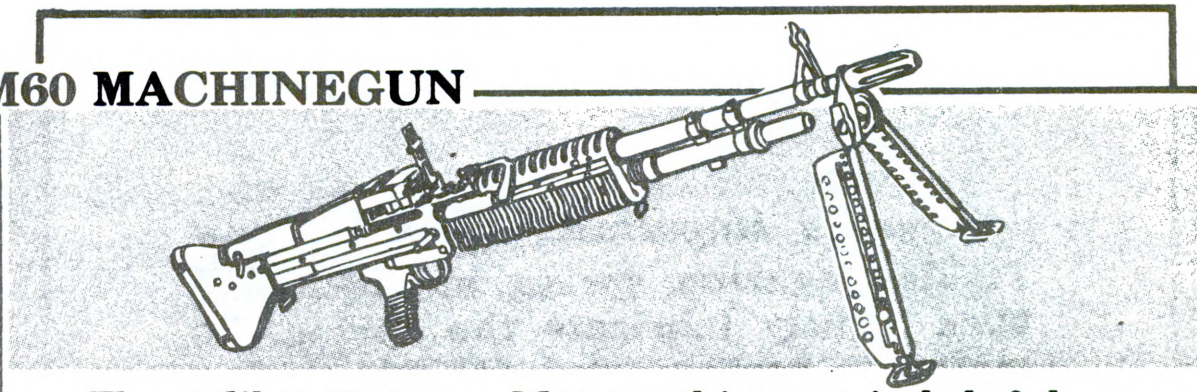
M60 MACHINEGUN



The caliber 7.62-mm M60 machinegun is belt-fed, gas-operated and automatic. It is issued with an attached bipod mount and a separate tripod mount. The machinegun can be effectively fired using either mount. Firing from the prone position, using the M122 tripod mount, permits the gunner to maintain the most control and obtain the highest degree of accuracy. Certain vehicular mounts (such as the pedestal mount on the M151 jeep) are available for the M60. When standing, the machinegun is employed from the hip, underarm or shoulder firing position. In infantry units all personnel must be trained on the M60 machinegun.

The M60 machinegun is an excellent weapon to suppress ATGM gunners, vehicles, and troops. Its high volume of fire has the capability to suppress enemy elements until a maneuver force can get into position to destroy the enemy elements or bypass them. The night vision device which is mounted on the M60 machinegun is the AN/PVS-2. The AN/PVS-2 should be mounted, boresighted, and zeroed on the M60 machinegun IAW TM 11-5855-203-13 prior to employment at night. The latest modification to the M60 machinegun barrel locking lever (spring loaded) prohibits the mounting of the AN/PVS-2 on those machineguns so modified. Not all M60 machineguns have been modified; however, a new mounting bracket which will fit both the new and old barrel locking levers is being produced.

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CHARACTERISTICS

WEIGHT OF MACHINEGUN	- 23 lbs (10.4 kg)
LENGTH OF MACHINEGUN	- 43.5 in (110.5cm)
MAXIMUM RANGE	3,735m
MAXIMUM RANGE OF GRAZING FIRE	- 600m

RANGES AT WHICH A 50-50 CHANCE OF TARGET HIT CAN BE EXPECTED FIRING BURST OF 6-9 ROUNDS

- 200m for moving point target (bipod mounted)
- 600m for a point target (bipod or tripod)
- 800m area target* (bipod mounted)
- 1100m area target* (tripod)

RATES OF FIRE:

SUSTAINED	RAPID	CYCLIC
- 100 rds per min	- 200 rds per min	- In excess of 550 rds per min

BASIC LOAD OF AMMUNITION - 600-900 rds

TYPES OF AMMUNITION

- Ball
- Tracer
- Armor Piercing

TRACER BURNOUT - 900m (approx)

*An area target is defined as the area in size that a fire team would occupy. The beaten zone of the machinegun coincides approximately with the area occupied by the fire team.

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IMMEDIATE ACTION PROCEDURES

If an M60 machinegun stops firing, the following actions are taken **within 10 seconds:**

1. **Cock the weapon, observing the ejection port to see if brass, link, or a round is ejected. Insure the bolt remains to the rear to prevent double feeding.**

2. **If brass, link, or a round is ejected, release the bolt handle chambering another round, relay on the target, and attempt to fire. If the weapon still does not fire, or if brass, link, or a round was not ejected, the weapon must be cleared, and the weapon and ammunition inspected to determine the cause of the stoppage.**

CARE AND CLEANING

To clean the M60, **use rifle bore cleaner (RBC) and a bore brush to clean the bore. After you have removed all of the fouling in the bore, use the chamber brush and RBC to clean the chamber.**

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When the chamber is cleaned, use dry patches to remove the RBC from both the bore and chamber, then swab them with PL special. Next, clean off the face of the bolt and let it dry. Wipe off the rest of the gun to remove any dirt or bore cleaner that may be present, and then lubricate all moving parts with a light coat of LSA.

Insure proper care and use of the barrels.

1. In order to prolong the life of the barrels, to retain accuracy, and to allow continuous firing for prolonged periods, two barrel assemblies are issued with each gun.

2. During continuous firing, the barrels are changed every 10 minutes, when firing at the sustained rate of 100 rounds per minute; every 2 minutes, when firing at the rapid rate of 200 rounds per minute; and every minute with firing at the cyclic rate which is in excess of 550 rounds per minute.

REFERENCES:

TM 9-1005-224-10, Operator's Manual, M60 Machinegun

FM 23-67, Machinegun, 7.62-mm, M60.

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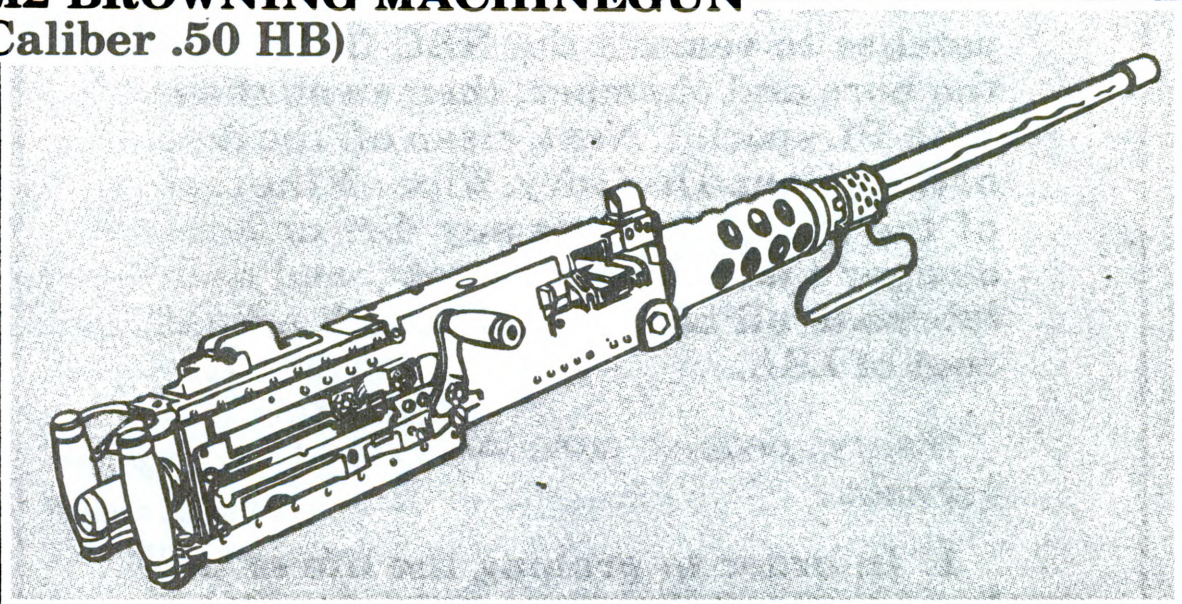
M2 BROWNING MACHINEGUN
(Caliber .50 HB)



The caliber .50 machinegun is belt-fed, recoil operated, and air-cooled. It is capable of single-shot as well as automatic fire. The primary infantry vehicular mount is the cupola of the M113A1 Armored Personnel Carrier. When used in the ground mode, the machinegun is mounted on the M3 tripod mount or the M63 antiaircraft mount. When engaging ground targets from a stationary position, the caliber .50 machinegun is fired in bursts of 9-15 rounds. When firing at aircraft, a continuous burst is used rather than several short bursts. When firing on the move, long bursts of fire are walked into the target. Enemy ATGM gunners, vehicles, and troops can be suppressed with a heavy volume of fire from the caliber .50 machinegun, until a maneuver force can destroy or bypass the opposition. The night vision device which is mounted on the caliber .50 machinegun is the AN/TVS-2. The AN/TVS-2 should be mounted, boresighted, and zeroed on the caliber .50 machinegun IAW TM 11-5855-202-13, prior to employment at night.

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CHARACTERISTICS

Weight of Machinegun	- 84 lbs (38 kg)
Weight of Tripod	- 44 lbs (20 kg)
Length of Machinegun	- 65 in (165.1cm)
Maximum Range of Grazing Fire	- 800m
Maximum Range	- 6,800m

Range at which a A 50-50 CHANCE of target hit can be expected:

Tripod Mounted Firing Burst of 9-15 Rounds

- 700m against a man (point target)
- 1000m against an armored target
- 1600m against an area target

Cupola Mounted Stationary Vehicle Firing Burst of 9-15 Rounds

- 500m against a man (point target)
- 800m against an armored target
- 1000m against an area target

Cupola Mounted Moving Vehicle Firing Burst of 15-30 Rounds

- 300m against a fire team sized position
- 500m against a squad sized position (probability of hit reduced to 0.3)

Rates of Fire

Sustained	Rapid	Cyclic
- 40 or less rds per min	- 40 or less rds per min	- 450-550 rds per min

Burst of Fire used in Air Defense	Types of Ammunition
- Continuous while target is in range	- Ball - Tracer - Armor Piercing Incendiary - Armor Piercing Tracer Burnout - 2200m (approx)

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FIRING FROM AN APC

To place fires on target use this technique

- **Hold the weapon tightly to the chest.**
- **Aim (point) slightly low.**
- **Fire and walk the rounds onto the target.**
- **Cease fire when the rounds begin going high and repeat the process.**

The gun does not have a safety, so when you are moving keep the weapon in the half-cocked position.

IMMEDIATE ACTION/CLEARING

If the caliber .50 machinegun fails to fire, the following actions are taken.

(1) Pull the bolt to the rear and observe for ejection (round or brass ejected).

(2) Return retracting slide handle forward.

(3) Relay and attempt to fire.

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The following procedures are used when clearing the machinegun.

Cold gun.

(1) Place weapon in single shot mode.

(2) Pull the bolt to the rear.

(3) Open the cover and remove the ammunition.

(4) Press the bolt latch release and ride the bolt forward.

(5) Pull the bolt to the rear.

(6) Inspect the chamber.

(7) Close the cover.

(8) Press the bolt latch release and ride the bolt forward.

Hot gun.

(1) A hot gun is a weapon which has fired more than 150 rounds in 2 minutes.

(2) To clear a hot gun, follow the steps for clearing a cold gun, except do not pull the bolt to the rear in steps (2) and (5). Simply press the trigger and fire the weapon. This prevents a cook-off outside the chamber.

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CARE AND CLEANING

To clean the caliber .50 machinegun:

(1) Disassemble the gun into its major groups or assemblies.

(2) Clean the bore and chamber, but do not oil them.

(3) Clean all metal parts thoroughly and apply a light coat of oil to all metal parts which do not come in contact with the ammunition.

Use rifle bore cleaner to clean the bore. When the bore is clean, dry it and any parts of the gun exposed to the bore cleaner. If you don't plan to use the weapon after cleaning, apply a thin coat of special preservative lubricating oil to the entire gun. If you do plan to use it, don't oil the bore or chamber.

When the bore cleaner is not available, hot or cold water can be used; however, warm, or hot, soapy water is recommended. After using soap and water, dry the barrel and apply a thin coat of special preservative lubricating oil.

REFERENCES

FM 23-65, Browning Machinegun, Caliber .50 HB, M2.

TM 9-1005-213-10, Operator's Manual: Machinegun, Caliber .50, Browning, M2.

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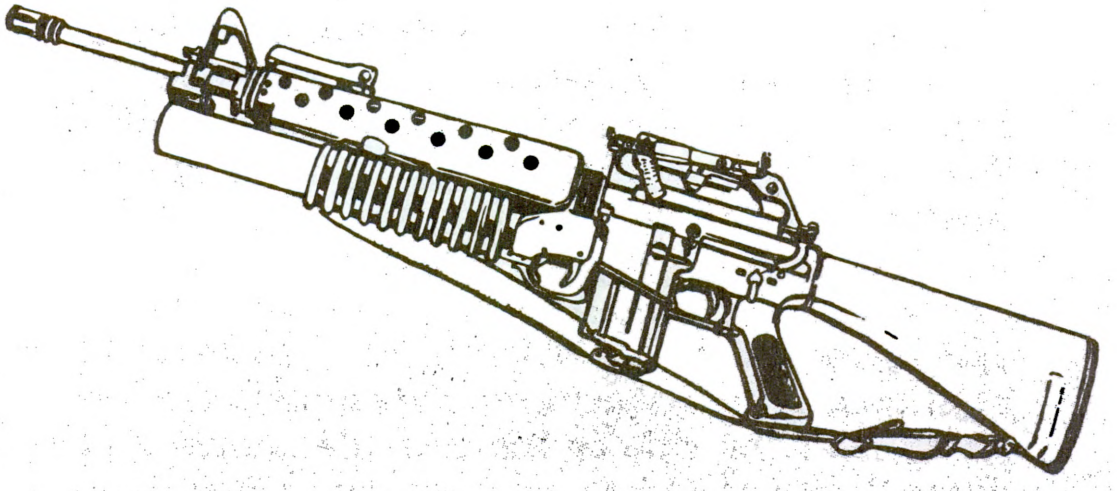
DUAL PURPOSE WEAPON



The Dual Purpose Weapon (DPW) consists of the M203 40-mm grenade launcher attached to an M16A1 rifle. Information on the rifle is found in a preceding section. The grenade launcher is a single shot, breech-loaded, pump-action weapon which fires a variety of ammunition. The grenade launcher provides the squad with a means of both suppressing and neutralizing targets that are located in dead spaces of grazing fire weapons. The squad's grenadiers using 40-mm ammunition can suppress or disable enemy armored vehicles until other antitank weapons such as the TOW, Dragon, or LAW can destroy the vehicle. This weapon is also capable of penetration of concrete, timber, or sandbagged weapons positions or the penetration of structures found in built-up areas.

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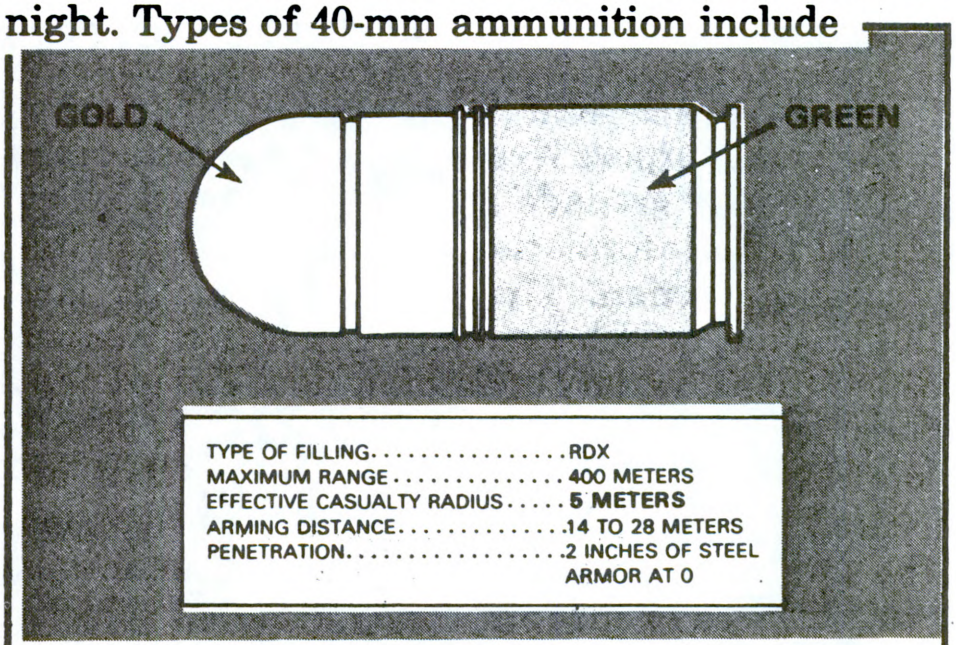
It also provides an illumination capability and a signalling capability to the squad. The firing positions providing the most stability for the gunner (thereby increasing the probability of a hit) are the standing supported and prone supported positions. The night vision device which is mounted on the DPW is the AN/PVS-4. The AN/PVS-4 should be mounted, boresighted, and zeroed on the DPW IAW TM 11-5855-213-10 prior to employment at night. This sight is used for firing both the rifle or the grenade launcher at night. Types of 40-mm ammunition include



M433 High Explosive Dual Purpose (HEDP). This round can penetrate 2 inches (5cm) of armor plate at a range up to 400 meters. It has a 5-meter casualty radius against exposed troops.

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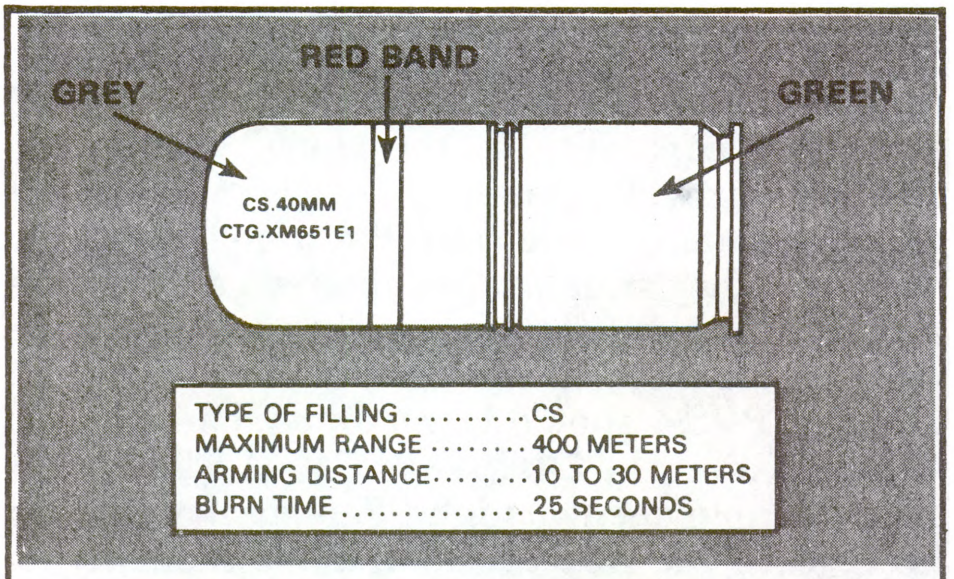
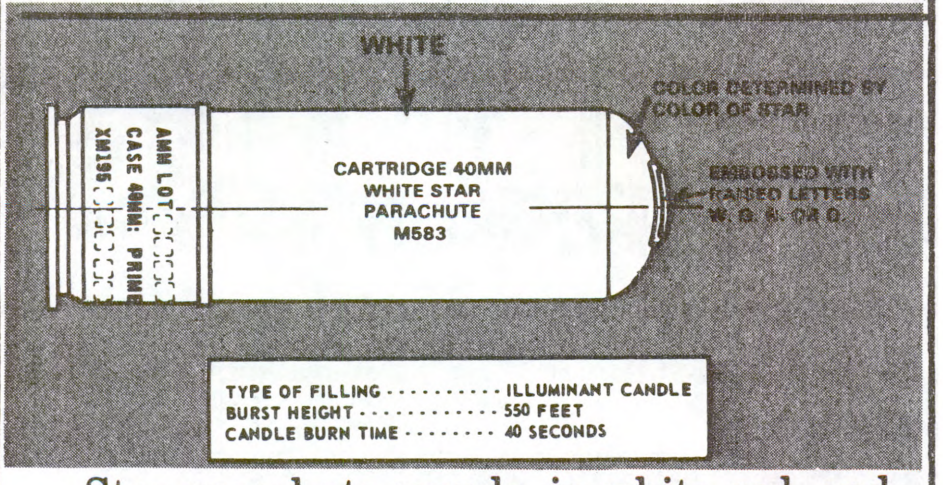


M651CS. Effective in driving the enemy from bunker positions or inclosed positions occupied in built-up areas.



Star parachute rounds, in white, red, and green, are effective signals and battlefield illuminants that can be placed 300 meters forward of the squad area, illuminating an area 200 meters in diameter for a period of 40 seconds.

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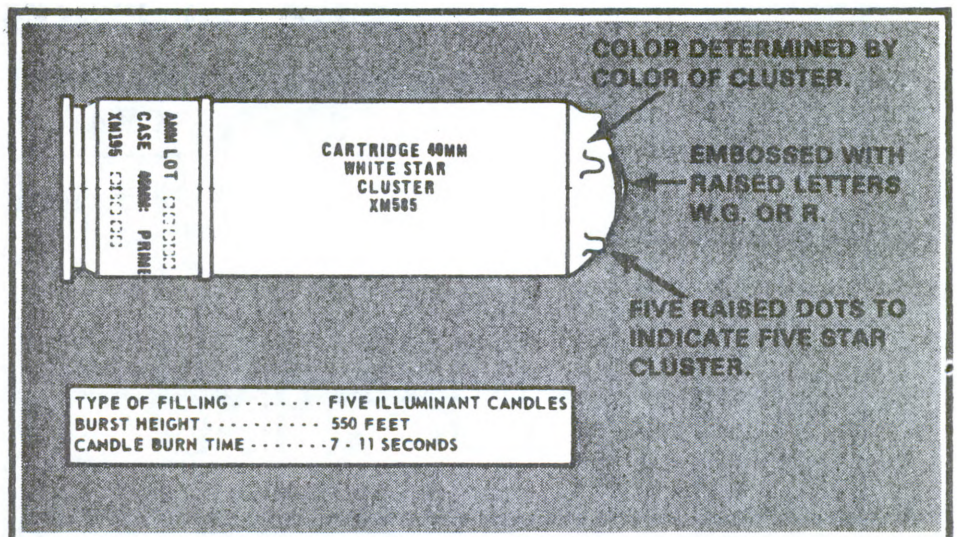
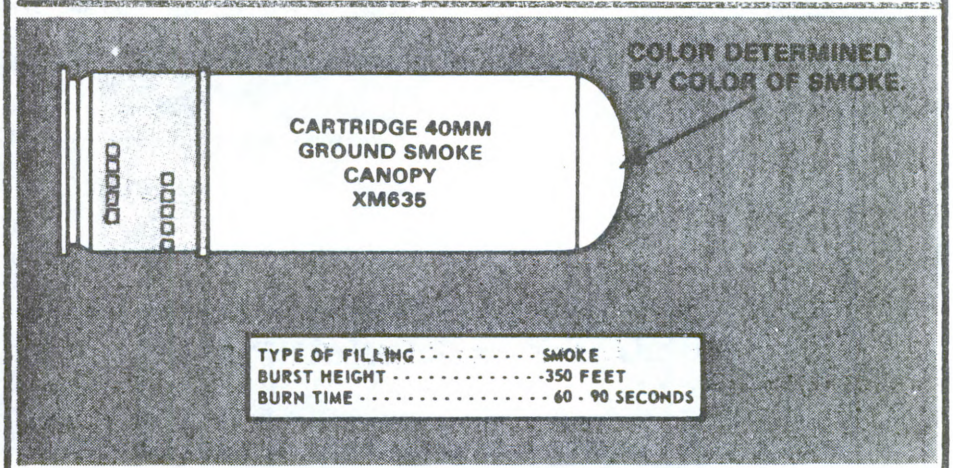

COLOR DETERMINED BY COLOR OF CLUSTER.
CARTRIDGE 40MM WHITE STAR CLUSTER XM585
EMBOSSED WITH RAISED LETTERS W.G. OR R.
FIVE RAISED DOTS TO INDICATE FIVE STAR CLUSTER.
TYPE OF FILLING - - - - - - - - FIVE ILLUMINANT CANDLES
BURST HEIGHT - - - - - - - - - - 550 FEET
CANDLE BURN TIME - - - - - - - 7 - 11 SECONDS

Star clusters, in red, white, and green, are used for signalling. Caution - The green star cluster may appear white in bright sunlight.


COLOR DETERMINED BY COLOR OF SMOKE.
CARTRIDGE 40MM GROUND SMOKE CANOPY XM635
TYPE OF FILLING - - - - - - - - - - SMOKE
BURST HEIGHT - - - - - - - - - - - - -350 FEET
BURN TIME - - - - - - - - - - - - - - - 60 - 90 SECONDS

Ground smoke, in red, yellow, and green, is used for spotting locations, and not for screening.

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CHARACTERISTICS

WEIGHT LOADED (M16A1 and M203)	- 11 lbs (4.98 kg)
LENGTH	- 29 in (99cm)

40-mm GRENADE LAUNCHER, M203

RANGES AT WHICH A 50-50 CHANCE OF TARGET HIT CAN BE EXPECTED:

AREA TARGET (FIRE TEAM SIZE)	- 350m
POINT TARGET	- 200m
MAXIMUM RANGE	- 400m

MINIMUM SAFE FIRING RANGES (HE & TP)

TRAINING	- 80m
COMBAT	- 31m
MINIMUM ARMING RANGE	- 14-28m*

BASIC LOAD FOR GRENADIER

40-mm GRENADES	- 36 rds
CAL 5.56-mm	- 140 rds

*This must be considered in close-in firing such as MOBA to insure round will explode.

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IMMEDIATE ACTION

COMBAT

In combat, should a misfire occur with the grenade launcher

1 Suppress the target using the M16-A1 rifle portion of the dual purpose weapon by firing one magazine in the semiautomatic mode.

2 Open the breech of the M203 and gently remove the 40-mm round.

3 After the round has been removed, inspect it to see if the round or the firing mechanism is defective. First examine the primer to see if it has been dented. If the primer has been dented, immediately reload the weapon with another round and resume firing. Keep the bad round separate from other ammunition.

4 If the primer has not been dented, the firing mechanism is at fault. The round may be reloaded and fired after the cause of the failure to fire has been corrected.

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Should a misfire occur in training

1. Shout *"MISFIRE"* and wait 30 seconds before extracting the misfire round.

2. Follow steps 2, 3, and 4 as you would in combat.

CARE AND CLEANING

The grenade launcher must be cleaned after it has been fired because firing produces deposits of primer fouling, powder ashes, carbon, and metal fouling. These deposits may collect moisture and promote rust if not removed.

Cleaning materials.

- **Rifle bore cleaner (RBC) is used to clean the bore of the launcher and provide temporary protection from corrosion.**
- **Any drycleaning solvent that does not contain acid can be used for cleaning the launcher of dirt, grease, oil, or corrosion preventives.**

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Lubricants.

Military lubricant MIL-L-46000A (LSA) is used for lubricating the launcher at temperatures of -35°F and above.

Lubricating oil, Arctic weather MIL-L-14107B is used at temperatures below 0°F.

Cleaning the launcher and ammunition.

Bore. **Attach a clean, dry rag to the thong and thoroughly moisten the rag with bore cleaner. After pulling the rag through several times, attach the bore brush to the thong and pull it through the bore several times. Repeat, using dry rags, inspecting the rag each time. Finally, pull a lightly oiled (LSA) rag through the bore to leave a light coat of oil inside the barrel. When cleaning the bore, the bore brush and rags should be pulled from the breech end to the muzzle end.**

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Breech insert. **Clean the face of the breech insert retainer with a patch and bore cleaner. Remove the bore cleaner with dry rags, and then oil the face of the breech lightly.**

All other parts. **Use a brush and dry rag to clean all other parts and surfaces. Apply a light coat of LSA to the exterior of the launcher after cleaning. For cleaning the rifle portion of the launcher, see the section covering M16A1 rifle.**

Ammunition. **Wipe any dirt or grime from ammunition with a dry cloth. If ammunition is corroded, turn it in to the ammunition point. Do not oil ammunition.**

REFERENCES

FM 23-31, 40-mm Grenade Launchers M203 and M79.

TM 9-1010-221-10, Operator's Manual: 40-mm Grenade Launcher, M203.

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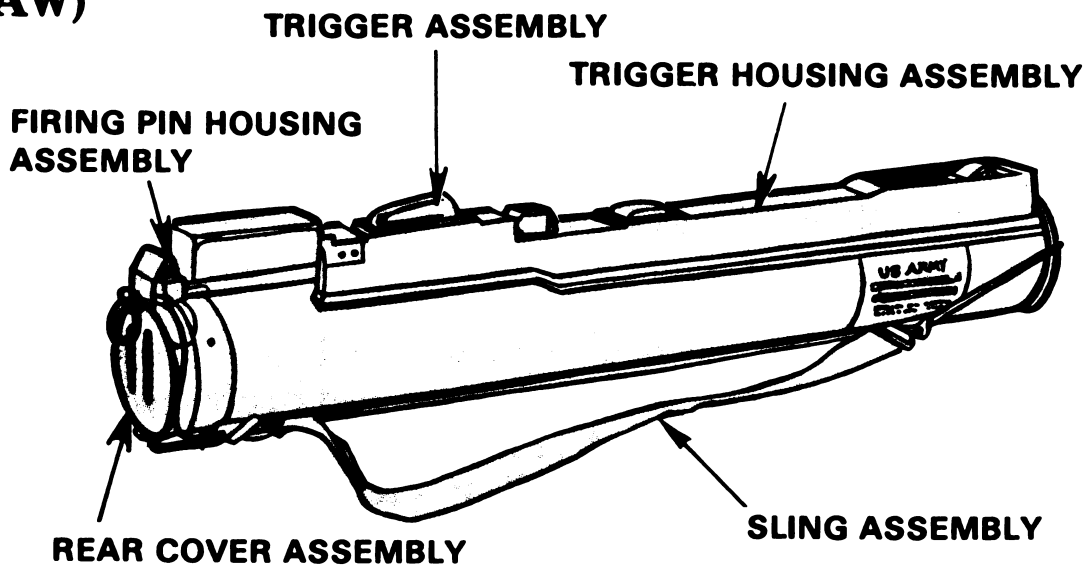
M72A2 LIGHT ANTITANK WEAPON (LAW)



The LAW is a self-contained unit consisting of a 66-mm HEAT rocket packed in a disposable fiberglass and aluminum launch tube. Its light weight coupled with its ability to penetrate in excess of 20cm of armor, gives you a weapon which can be readily employed by all of your soldiers to engage enemy armor, bunkers, or other hardened targets out to a range of 200 meters. The firing positions providing the most stability for the gunner (thereby increasing the probability of target hit) when firing the LAW are the standing supported, prone, and prone supported positions. The night vision device which is mounted on the M72A2 LAW is the AN/PVS-2. The AN/PVS-2 should be mounted and boresighted on the M72A2 LAW IAW TM 11-5855-203-13, prior to employment at night.

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CHARACTERISTICS

WEIGHT (COMPLETE)	- 5.2 lbs (2.36 kg)
LENGTH (CLOSED)	- 26 in (66cm)
LENGTH (EXTENDED)	- 35 in (89cm)
VELOCITY	- 475 fps @ 70°F (145 mps @ 21°C)
MAXIMUM RANGE	- 1000m

RANGES AT WHICH A 50-50 CHANCE OF TARGET HIT CAN BE EXPECTED:

STATIONARY	- 200m
MOVING	- 150m
MINIMUM ARMING RANGE	- 10m
ARMOR PENETRATION	- 8 in (20cm)

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RANGE DETERMINATION

The probability of hitting a target with the M72A2 LAW is significantly increased if the gunner knows the range to the target. The following methods can be used to determine range: rangefinders, measurement of the distance by map inspection, intersection using compasses, pair and sequence firing method, pacing, use of direct fire weapons such as machineguns, and visual range estimation. Visual range estimation is the least desirable method due to its inaccuracy. After the ranges to probable target locations have been determined, they should be recorded on a sector card for ready reference.

METHODS OF ENGAGEMENT

There are four methods of engagement with the M72A2 LAW. They are: single, sequence, pair, and volley firing.

(1) Single Firing.

In single firing, a target is engaged by one individual, firing one LAW, with no succeeding shots. This method should be used only at very short ranges -- 50 meters or less. Beyond this range, one individual firing a single LAW at a target is relatively ineffective, because the chances of a first round hit/kill are relatively low.

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(2) Sequence Firing.

In sequence firing, the target is engaged by only one gunner who is equipped with two or more LAWs. Prior to firing, the gunner should extend several launchers. After firing the first LAW, the gunner observes the impact of the round. If he achieves a hit, he should continue to fire using the same sight picture until the target is destroyed. If the first round misses, he should make adjustments to the range and lead of succeeding rounds until a target hit is achieved. The gunner continues to fire until the target is destroyed. One gunner having two or more LAWs prepared constitutes sequence firing regardless of whether a target hit is achieved with the first round.

(3) Pair Firing.

In pair firing, two or more gunners, equipped with two or more LAWs, engage a target. Each gunner inspects and prepares several LAWs. The gunners exchange information when engaging a target. The first gunner seeing the target identifies the target, announces the estimated range and lead he will use (**Example:** TANK, 150 METERS, FAST TARGET) and fires. The second gunner announces a revised estimate of range and lead (if appropriate) and fires. The gunners continue exchanging range and lead information until a target hit is achieved. Once the range and lead have been determined, all gunners, on command, will engage the target until it is destroyed. Two or

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and/or target reference points. The volley method is desirable because more rounds are fired at a target at a given time. This will increase the probability of hitting the target.

The preferred methods of engagement are pair and volley fire. Pair firing has the advantage of having two or more gunners track the target simultaneously. A miss by the first gunner will result in the second round being rapidly fired with the revised estimation of range and leads. A high volume of antitank fire can be achieved in the minimum amount of time by using volley firing. If pair and/or volley firing cannot be implemented, the sequence firing method of engagement should be used. One gunner firing two or more weapons can produce a volume of antitank fires on the target. Finally, there will be situations where only single firing can be used. A well trained gunner can successfully engage a target with a single LAW providing the target is at a close range (50 meters or less).

Regardless of the method of engagement used, the closer the armored vehicle, the greater the probability of first round hit.

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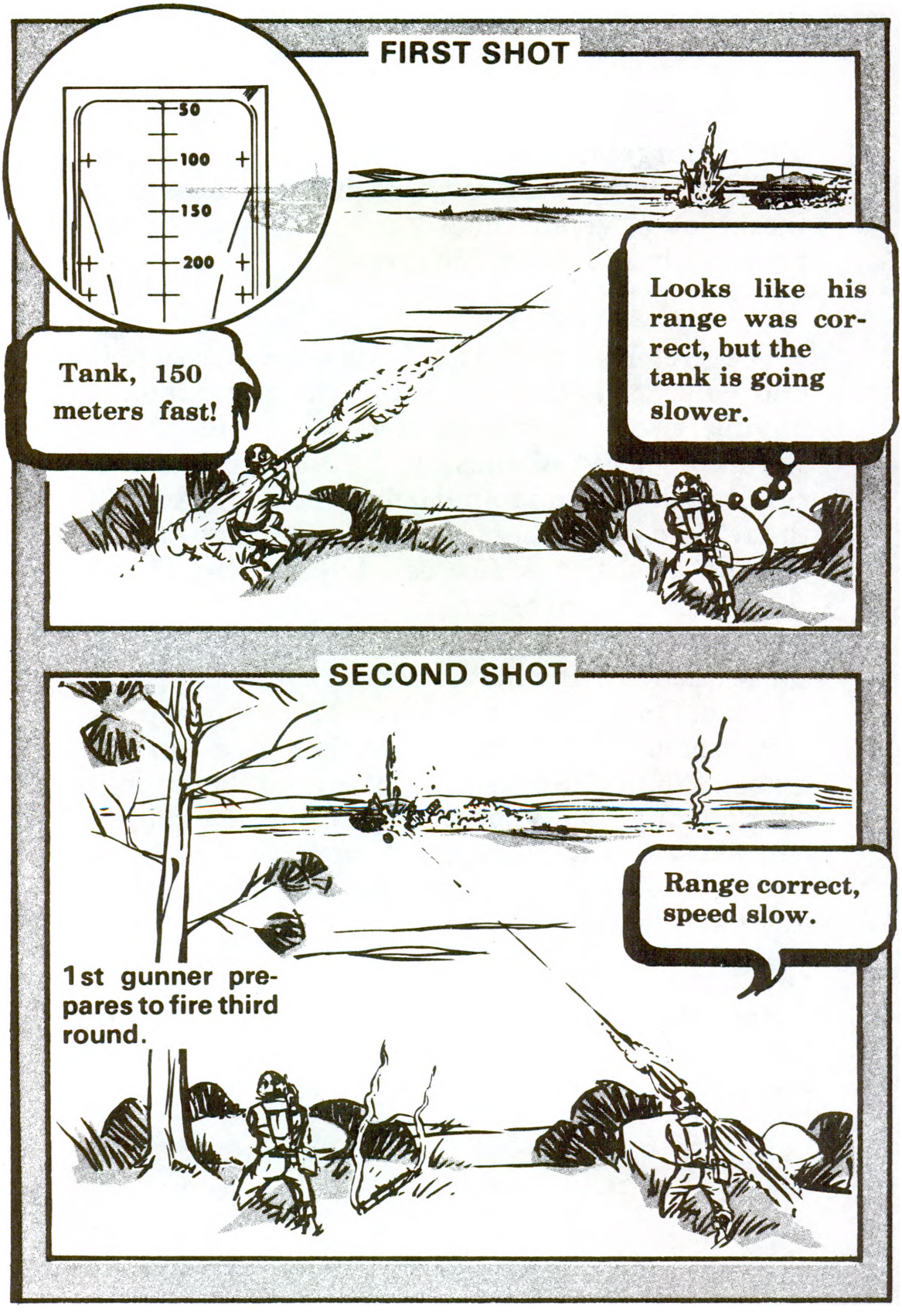

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IMMEDIATE ACTION HANGFIRES AND MISFIRES

A failure to fire with the LAW may be either a hangfire or a misfire. Since the gunner cannot distinguish between a hangfire and a misfire, he must treat any failure to function as a hangfire and follow this procedure.

1. Immediately resqueeze the trigger bar.

2. Return the arming handle to safe.

3. Remove LAW from shoulder and collapse and re-extend (insuring his hands are clear of the front and rear tube openings).

4. Arm the LAW, aim and fire.

5. If the LAW again fails to fire, return to safe, remove from shoulder, collapse the tube (this prevents the firing mechanism from functioning) and discard for a new LAW.

NOTE: Do not leave an intact LAW on the battlefield; the enemy can use it.

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Training Misfire Procedures

1. Immediately resqueeze the trigger bar.

2. Announce misfire.

3. Wait 10 seconds, keeping the weapon pointed on target.

4. Return safety handle to the SAFE position.

5. Take launcher off the shoulder.

6. Keep the launcher pointed down-range for 1 minute.

7. Depress the detent and collapse the launcher approximately 4 inches.

8. Re-extend the launcher to the fire position.

9. Check backblast area.

10. Place the weapon on the shoulder, move trigger safety handle to the arm position, aim, and attempt to fire. If the launcher fails a second time, repeat steps 1 through 5. Do not collapse the launcher a second time, but call EOD to dispose of the complete unit (in training), or dispose of it in accordance with your unit SOP.

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CARE AND CLEANING

No maintenance is required for LAW beyond keeping the exterior clean and protecting it from physical damage. Prior to employing the LAW check it to insure that it is safe to fire. If it is dented badly, don't try to use it.

REFERENCES

FM 23-33, 66-mm HEAT Rocket M72A2, and M72.

TM 9-2340-214-10, 66-mm Light Antitank Weapon (LAW) System M72A1 and M72A2.

TM 9-1340-214-12, Operator and Organizational Maintenance Manual, 66-mm Light Antitank Weapon System M72 Series.

TM 9-1340-203-20, Rocket Launcher, M190 with Subcaliber 35-mm Practice Rocker, M73.

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APPENDIX I

COMMUNICATIONS

1. GENERAL. The establishment of an effective communications system is of the utmost importance to a maintenance unit in the efficient accomplishment of its mission. An adequate system allows supported units to request assistance from the unit quickly, permits proper command and control of subordinate elements, and provides a means of instructing subordinate elements that are operating away from the principal company area. An adequate system also facilitates control and direction of the unit by higher headquarters and permits transmission of vital tactical information -- warning of NBC attack, radiological fallout, and changes in the situation that may increase the unit's workload. Communications means available to the maintenance unit include radio, wire, messenger, visual, and sound.

2. EXTERNAL COMMUNICATIONS. The maintenance company possesses limited organic tactical communication systems to contact its customers. For that reason, the unit must depend upon outside resources. That resource is the area signal center. Each area signal center operates a communications center which will transmit and receive messages for units in its area of responsibility. The types of services these signal centers provide are wire (telephone and teletypewriter), messenger, and radio-wire integration (RWI) which permits telephone users to gain access to FM tactical radio nets. To obtain this service, the unit's commander should contact his supported unit headquarters for the location of the area signal center. When he has coordinated with the area signal center, it will, on a priority basis, install wire lines to his unit. The number of lines to the unit will normally be specified by the signal SOP. When moves are planned, notification must be given to the signal center as far as possible in advance of the move in order to insure that communications requirements can be met at the new location. Utilization of the area signal center will enable the maintenance unit to communicate with all of its supported units as well as its parent headquarters.

3. INTERNAL COMMUNICATIONS. For internal communication, wire is the principal means. Wire communication is highly effective and provides person-to-person conversation with a break-in operation (capability of interrupting the conversation), and is more secure than radio communication (though security is never taken for granted when transmitting in the clear). Only a limited number of telephones are available to a unit by its TOE. Commanders should make sure that the most advantageous system is employed. Regardless of assignment of the telephones by the TOE, some phones must be borrowed from the operating sections for use at observation posts and other security facilities.

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During hours of darkness or during an increased enemy threat, it may be necessary to place all phones except those utilized by the commander in defensive positions.

a. Switchboards are used to increase the flexibility of the wire system and to reduce the number of wire lines needed. All unit phones should be connected to the switchboard which is also connected to an Army area signal center. The switchboard must be manned constantly and should be located in an area (building, foxhole, etc) where it is protected from disruption from enemy attack. The unit SOP should specify how the switchboard is to be manned during an attack.

b. One method of insuring communications during an attack with all defensive positions is the use of the "hot loop." This method requires that all telephones be connected in series on the same line which is "looped" back to the starting point. In case the line is broken at one point, communications can still be maintained. Another advantage is that a call by one position is heard by all telephone users. This cuts down on the time needed to pass messages. A disadvantage is that to contact one position, all positions must be notified.

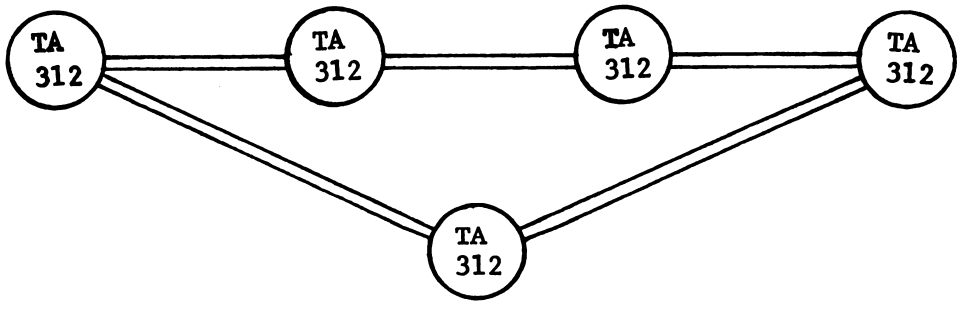

Figure I-1. Hot loop.

c. If time permits, wire should be installed overhead within the maintenance unit position provided suitable trees, buildings, or telephone poles are available. Overheading the wire lines will prevent tracked or heavily laden vehicles from breaking the wire. The wire should be strung at least 18 feet above the road surface. If natural supports are not available, the use of lance poles is recommended (figure I-2). Salvage wire should be used to guy the poles, and the angle between the guy and the ground should be approximately 45 degrees. Plan for about 6 inches of sag for every 25 meters of line to prevent high winds, sleet, or snow from damaging the lines. Careful siting of the wire line will help ease maintenance and minimize loss of communications. If for some reason the wire lines cannot be overheaded, then they must be laid on the surface. Plan for at least 20% slack along the line. This will allow the wire

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to lay flat on the ground and simplifies maintenance and construction changes. Where the line crosses a road, it must be buried at least 12 inches deep in a trench at right angles to the road.

4. COMMUNICATIONS SECURITY. Communications security consists of those measures taken to prevent or delay the obtaining of information of military value from communication sources by unauthorized persons. The following are some of the security precautions that should be observed:

a. Radio silence should not be violated.

b. There should be no unnecessary transmissions, such as excessive testing.

c. Excessive transmitting power should not be used.

d. All messages should be transmitted by the most secure means available, consistent with established procedures.

e. Personnel transmitting clear text messages by voice radio must use prescribed authentication systems and operations codes.

f. The wording and content of all messages to be transmitted should be preplanned.

g. Transmissions will be as brief as possible.

h. Communications channels -- both radio and telephone -- will be used for transmission of official information only. No personal conversations are authorized.

i. At no time will rank be mentioned in messages. Actual names should be avoided.

j. The prescribed phonetic alphabet will be used.

k. Above all, the ability of the enemy to intercept and use for intelligence purposes any messages transmitted should not be underestimated.

5. COMMAND RESPONSIBILITY. It is the responsibility of the unit commander to insure that all members of the unit engaged in communications have sufficient training to perform their jobs in an efficient and secure manner.

References: FM 25-2 (Test), Unit Commanders' Handbook; Fort Benning, GA.
ST 7-180, Infantry Communications Data.

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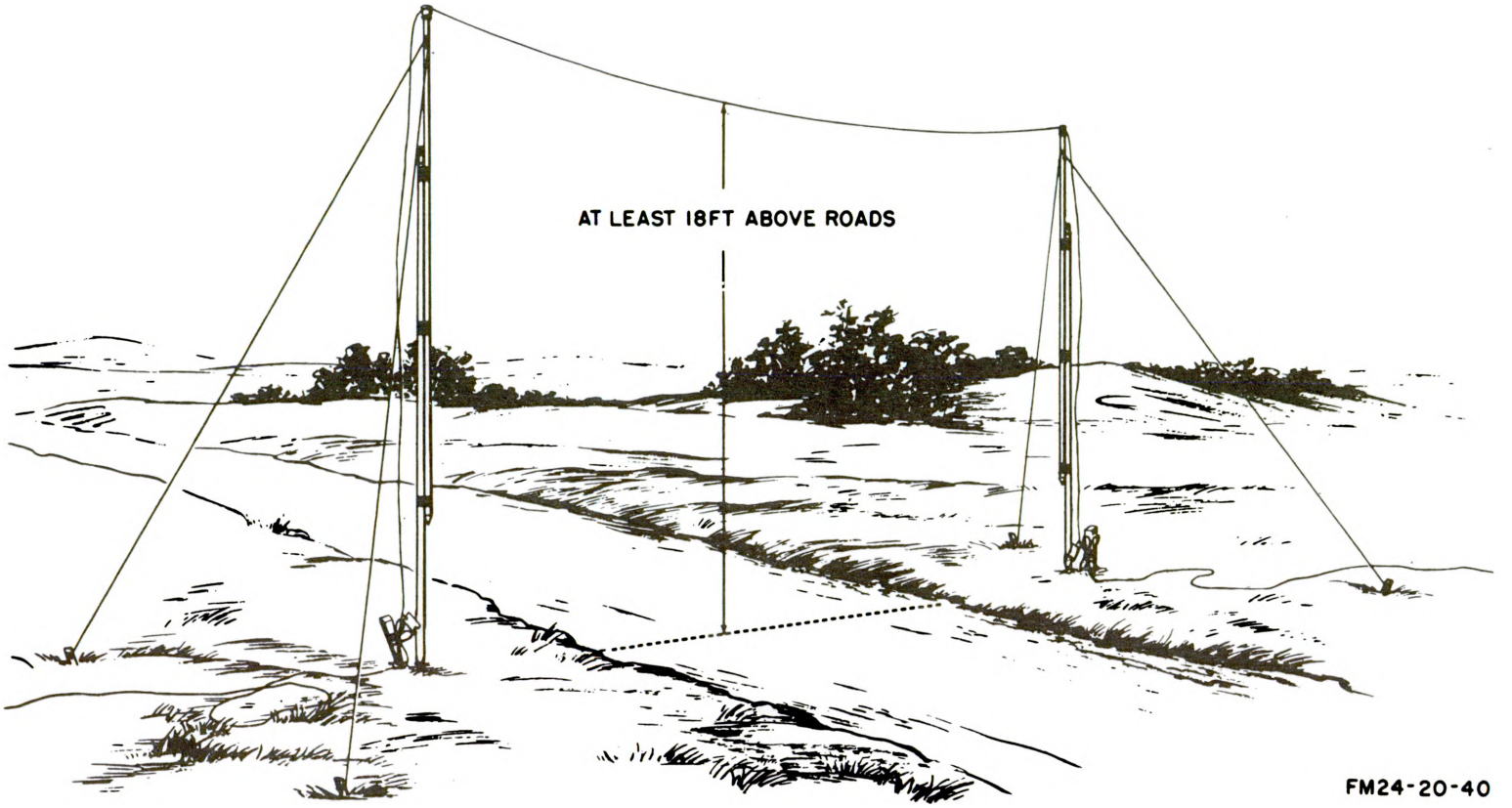

Figure I-2. Wire construction across roads using lance poles.

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COMMUNICATIONS

The squad leader must have a means of communication to control his squad, respond to the platoon leader's instructions, and render reports as appropriate. Preparation for every operation must include communication planning, training, and maintenance.

SOUND AND VISUAL

Squad leaders must often communcate by means other than voice or written messages. Prearranged signals provide communication for control and coordination between the squad leader and his men. Signals must be given correctly and distinctly so they cannot be misunderstood, and practiced until their use becomes second nature.

VISUAL COMMUNICATION

ADVANTAGES

Visual signals are used for transmitting messages quickly over short distances and for identifying friendly troops. They are most useful during radio and listening silence. Use them to keep down the amount of radio traffic within platoons.

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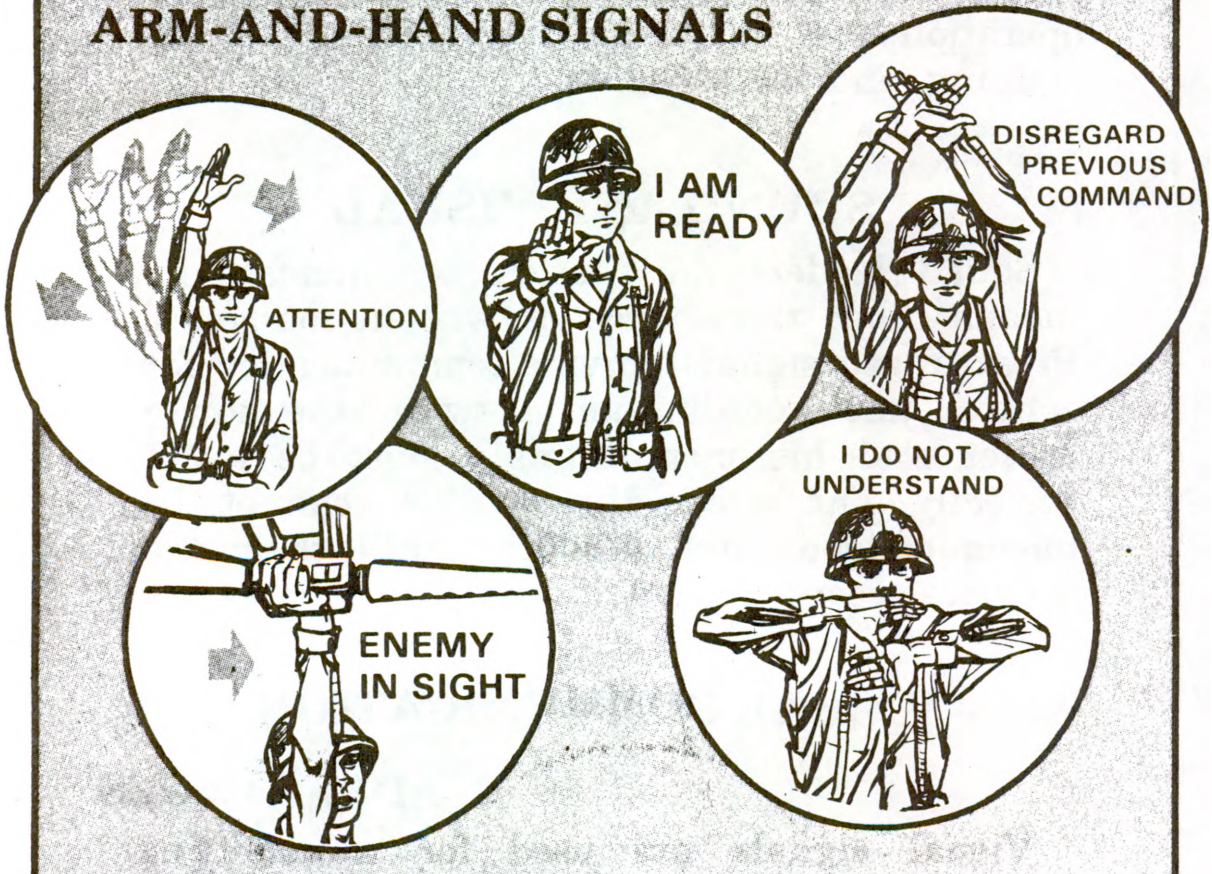
DISADVANTAGES

Visual signals are easily misunderstood and open to interception. The enemy may use similar signals to confuse and deceive. Visual signals are restricted when visibility is poor or line-of-sight positions are not available. Sometimes, they are not used because of security.

ARM-AND-HAND SIGNALS



When an action or movement is to be performed by one or more men of a unit, a preliminary signal is given by pointing toward the person(s) to perform the movement. Unless otherwise indicated, the man giving the signal will face those for whom the signal is intended.

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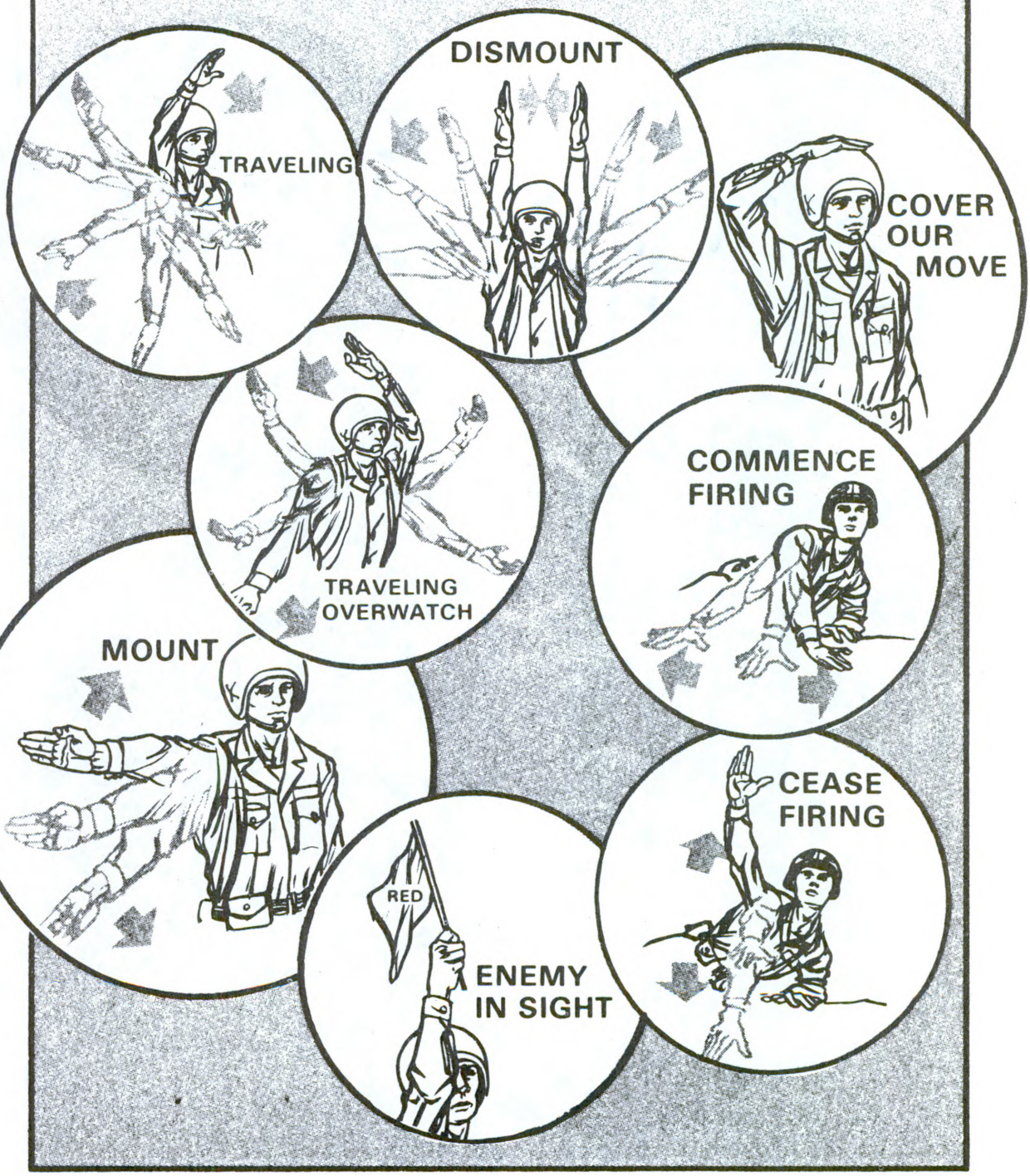
Leaders use standard and special arm-and-hand signals to control small unit actions and for recovery operations and vehicle movements.



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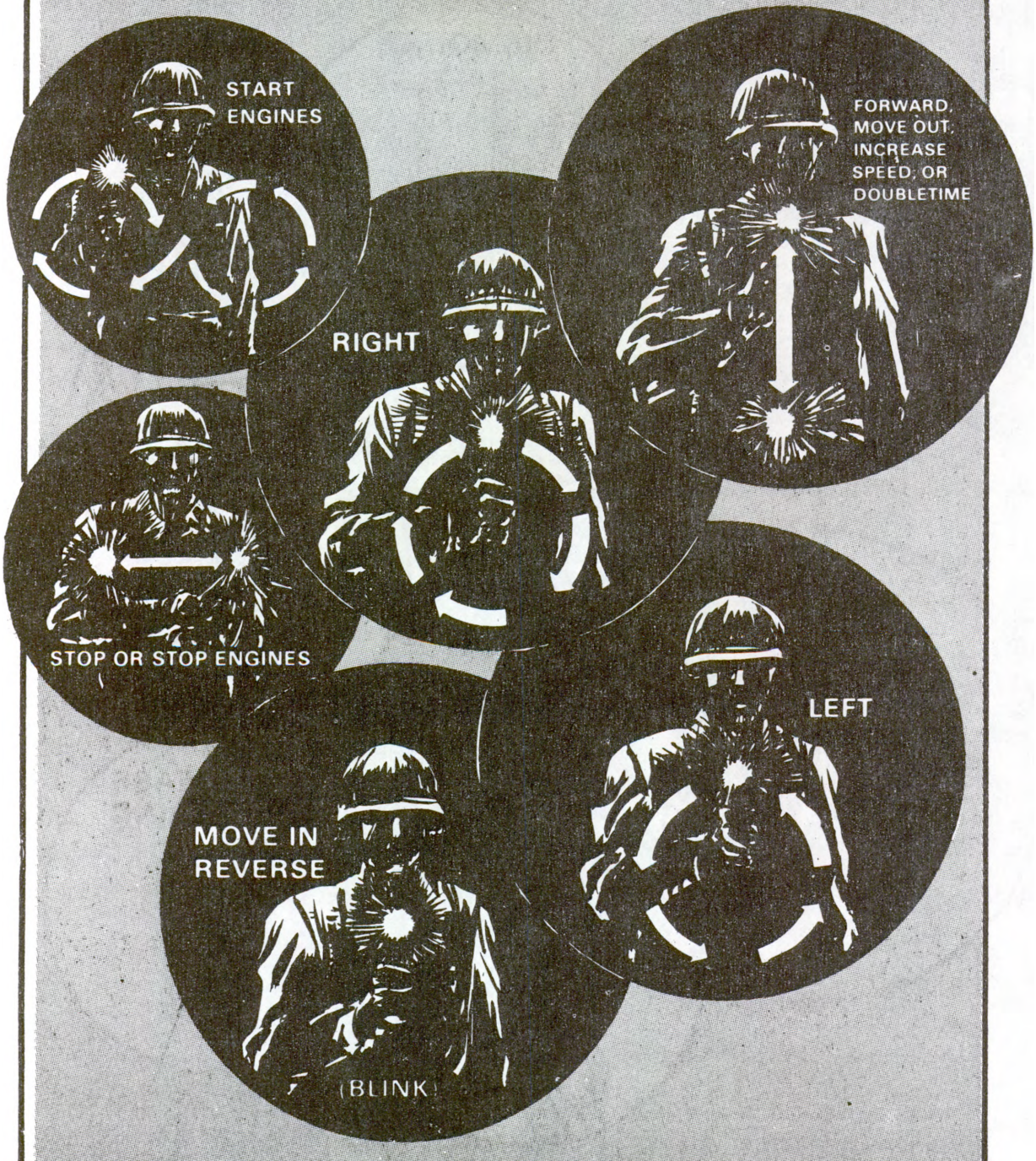
During periods of limited visibility, vehicles can be controlled with flashlights using the following signals:



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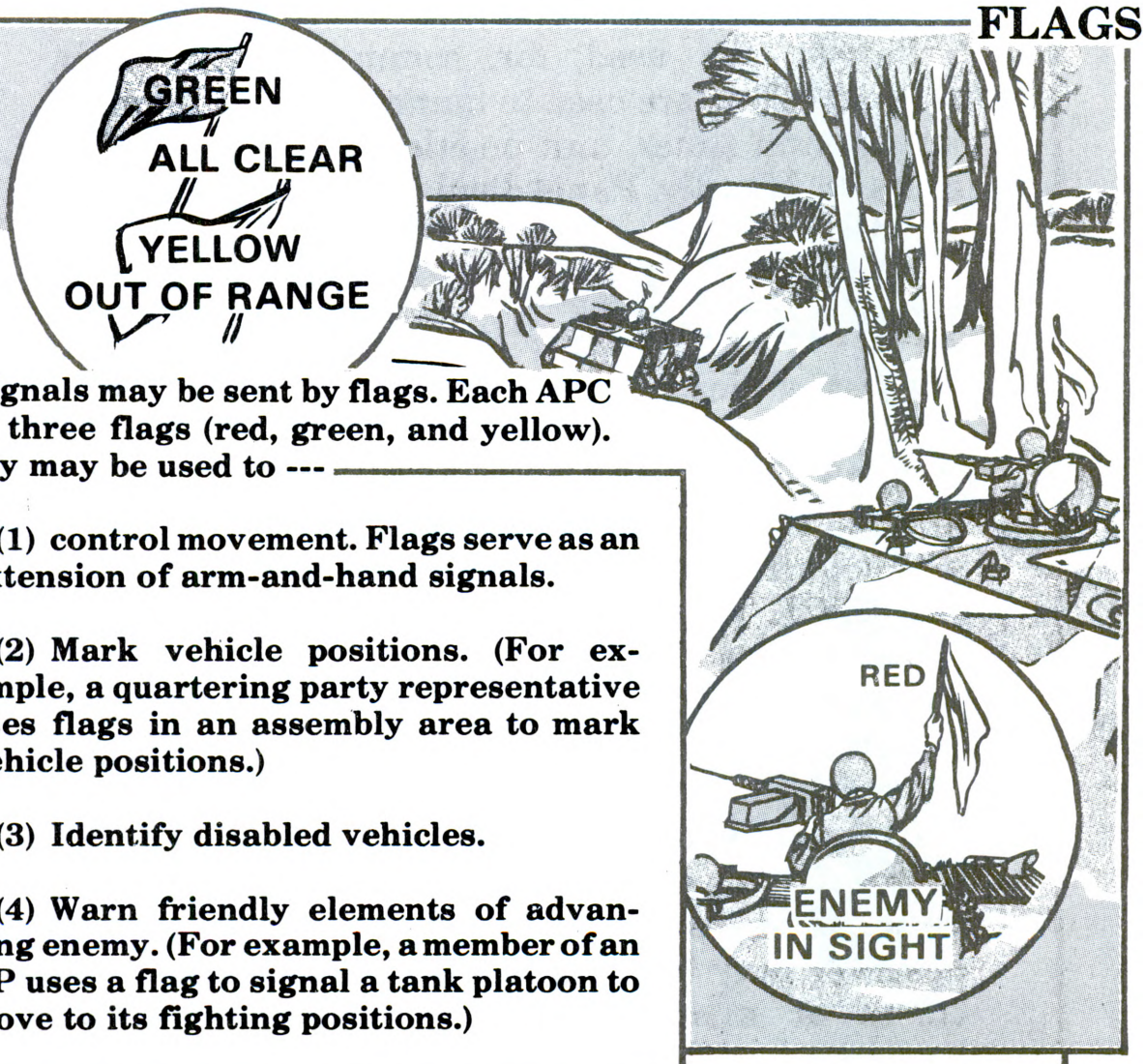
OTHER VISUAL SIGNALS

Mirrors, flags, and panels may be used by the squad leader to communicate with his men or other units. Their use is predetermined and their meanings are given to the squad leader by his platoon leader before each operation. The squad leader insures that each of his men understands the meaning of each signal and its use.

FLAGS



Signals may be sent by flags. Each APC has three flags (red, green, and yellow). They may be used to ---

(1) control movement. Flags serve as an extension of arm-and-hand signals.

(2) Mark vehicle positions. (For example, a quartering party representative uses flags in an assembly area to mark vehicle positions.)

(3) Identify disabled vehicles.

(4) Warn friendly elements of advancing enemy. (For example, a member of an OP uses a flag to signal a tank platoon to move to its fighting positions.)

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LIGHTS

Use flashlights, headlights, xenon searchlights, and other lights to transmit brief prearranged messages, such as the identity of friendly units. These signals are in the CEOI or fixed by the commander. Make sure that the enemy cannot detect the light source.

PANELS

Panels are used for communicating with aircraft. They are used to mark helipads, landing areas, drop zones, unit positions, and to identify units as friendly. Panel displays are prescribed in the CEOI.

PYROTECHNICS

Pyrotechnics are munitions containing chemicals that make a smoke or brilliant light while burning. They are used to signal or light up an area at night and are available in several types and colors. Pyrotechnic signals are prescribed in the CEOI. These signals are generally used for friendly units' identification, fire support control, target or position marking, and for ground-to-air communication. Their advantage is the speed with which information can be transmitted to large numbers of troops and isolated units. Combinations of colors fired at the same time or in series increase the possibility of error since an observer may be unable to distinguish different colors or miss part of the series. Messages

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transmitted by pyrotechnics should be confirmed quickly by another means of communication, since the originator does not know that the pyrotechnic signal was seen and understood.

Pyrotechnic signals can be imitated by the enemy. Therefore, they cannot be fully trusted unless the signaler can be identified.

Pyrotechnic signals can be seen by the enemy also. Therefore, do not expose positions or intentions of friendly units. If you use smoke grenades to obscure enemy observation, be sure that the color used does not have a CEOI designated meaning which might cause other supporting troops to interpret the smoke as a signal.

SOUND COMMUNICATION

Such simple devices as whistles, bugles, horns, sirens, gongs, bells, klaxons, voice amplifiers, and explosive devices are used for communicating. Principal uses of sound signals are to attract attention, transmit prearranged messages, and spread alarms. Sound signals are satisfactory only for short distances; range and reliability are greatly reduced by battle noise. Since they are open to enemy interception, they may be restricted for security reasons. Sound signals must be simple to avoid misunderstandings. The meanings for sound signals are prescribed by the unit SOP and CEOI.

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MESSENGERS

When using messengers, squad leaders must be familiar with the use of written messages. A message is any order, report, or other information to be transmitted by communications means. The text of a message must be clear, concise, and complete. Do not use unnecessary words. When time is critical and the use of messengers is impractical, the transmission of a message via radio or wire is necessary, and the receiver must copy the message exactly as transmitted.

RADIO

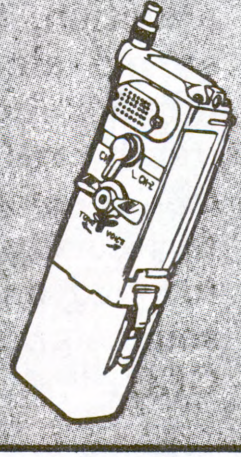
The operating range of radios depends on the type of set, the skill of the operator, weather, terrain, and interference. Power lines and steel structures close to a radio antenna will reduce its operating range. Radio communication is subject to natural interference, interference from other radio stations, and deliberate interference (jamming). Here are some of the radios you will use.

FM TRANSMITTER (AN/PRT-4)

The Squad Radio-Portable FM TRANSMITTER (AN/PRT-4) is used for communication between the squad leader and his team leaders.

Planning range:

Channel 1: 1600 meters.
Channel 2: 500 meters.
Battery life: (BA-300): 35 hours.



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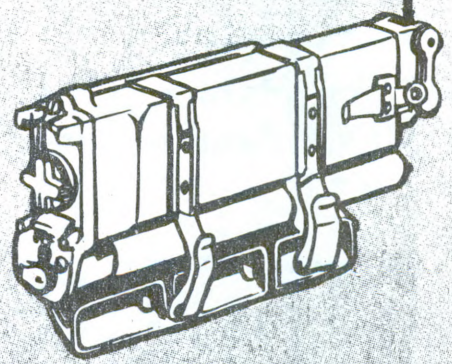
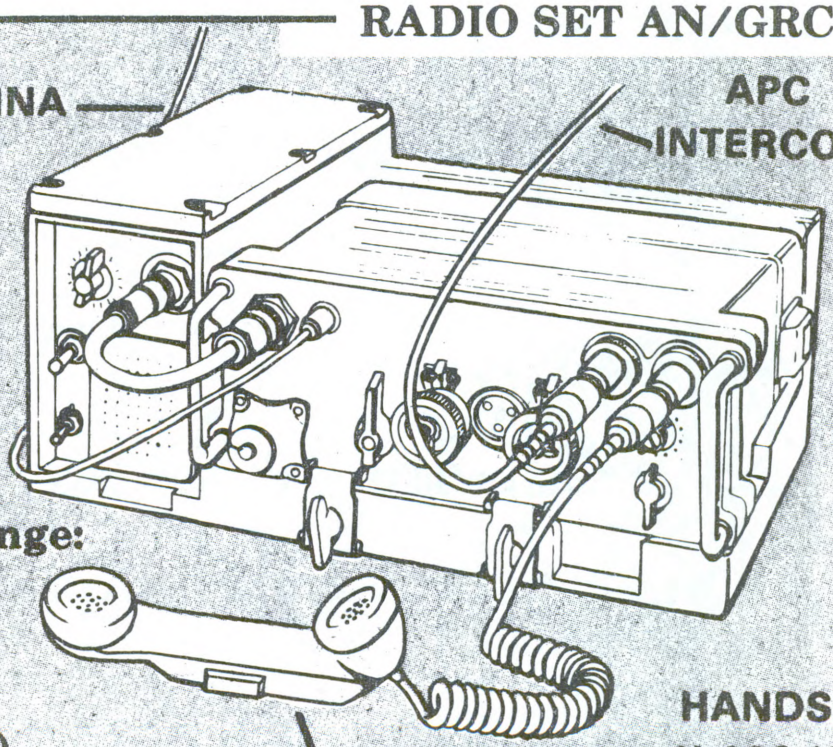
RECEIVER (AN/PRR-9)

RECEIVER (AN/PRR-9)
Receiver only one channel
Battery life: BA-505: 18 hrs.
BA-4505: 36 hrs.

This radio has set channels and these are changed by the Battalion Communications Platoon as necessary.



RADIO SET AN/GRC-160



Planning range:
12 kms
(mounted)

8 kms
(dismounted)

Frequency band: 30-75-5 mhz

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WIRE COMMUNICATION

The decision to establish wire communication depends on need, time available, and capability to install and maintain a wire net.

Its advantages are ---

- **Wire is more secure than radio.**
- **Wire offers conversation with break-in operation.**

Its disadvantages are ---

- **Installation is time consuming.**
- **Wire lines can be broken by traffic or artillery fire.**
- **Wire communication is not practical for mobile operations.**

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RULES FOR RADIO AND WIRE COMMUNICATIONS

Listen before transmitting (**sending**).

Make messages short and clear.

Speak clearly, slowly, in natural phrases, and pronounce each word distinctly. If receiving operator must write, allow enough time for writing.

If jammed (**using radio**), try to continue to operate and immediately notify higher headquarters by a different means of communication that you are being jammed. Offset the effects of the jamming by moving the radio set.

In all cases of radio and wire traffic, do not waste time - send the message and get off the net.

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RADIOTELEPHONE PROCEDURES

Certain commonly used prowords have distinct meanings and are used to shorten the amount of time in voice communication and to avoid confusion. The squad leader must be familiar with them and their use.

Over -- "This is the end of my transmission to you and a response is necessary. Go ahead, transmit."

Say again -- "Say again all of your last transmission."

Correction -- "An error has been made in this transmission (or message indicated). The correct version is ---------."

I say again -- "I am repeating transmission or portion indicated."

Roger -- "I have received your last transmission satisfactorily."

Wilco -- "I have received your message, understand it, and will comply."

Out -- "This is the end of my transmission to you and no answer is required or expected."

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COMMUNICATION SECURITY

Communication security denies or delays unauthorized persons from gaining information of value from telecommunications. It includes

- **Using authentication to insure that the other communicating station is a friendly one.**
- **Using only approved codes.**
- **Designating a period when all radio equipment is turned off.**
- **Restricting the use of radio transmitters. Monitoring radio receivers.**
- **Enforcing net discipline and radiotelephone procedures. All stations operating within a net must use authorized prosigns and prowords, and must limit transmissions to official traffic.**
- **Selecting radio sites with a hill or other shield between it and the enemy.**
- **Using direction antennas when feasible.**

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Electronic counter-countermeasures (ECCM) prevent or overcome enemy electronic warfare. ECCM at platoon level consists mainly of the use of proper signal security and antijamming techniques.

ANTIJAMMING

Radio operators use antijamming procedures to reduce enemy jamming effects. These procedures are

RECOGNITION

The first thing an operator must do when his radio receives interference is to try to find what is causing the interference. He can't immediately assume jamming, because symptoms of jamming are often similar to other types of interference. Removal of the receiver antenna tells you if the interference is being generated internally by the receiver. If interference decreases when the antenna is removed, the interference is jamming.

CONTINUED OPERATION

Normal radio operations should be continued once jamming has been identified so that the enemy can't determine the effect of his jamming. The rule is: During jamming, continue operation unless ordered to shut down.

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REPORTING

All operators must report jamming to their next higher headquarters by another means of communication; for example, wire or messenger. **A jamming report contains**

- **Date and time of jamming.**
- **Frequencies affected.**
- **Type and strength of jamming signal.**
- **Designation of the unit making the report.**

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The DOs and DON'Ts of COMSEC:

DO enforce proper use of authentication systems.

DO use only authorized authentication systems.

DO assume that your radio transmissions are being intercepted by the enemy.

DO use minimum power, minimum transmission times, and proper site selection.

DON'T use electrical communications when messengers will serve the purpose. Messengers are the most secure means of communication.

DON'T paraphrase or try to talk around the subject. If the man you are talking to can understand, so can the enemy.

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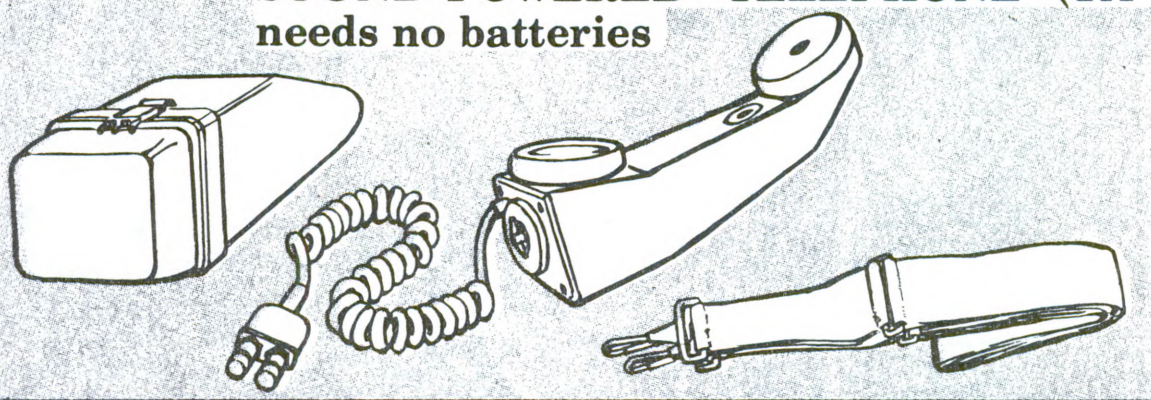
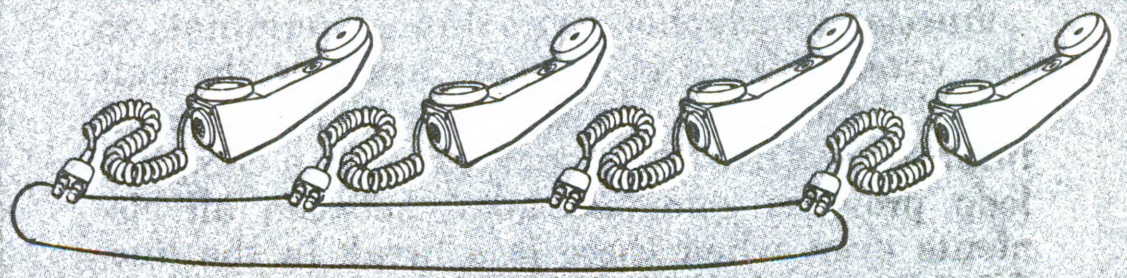
SOUND-POWERED TELEPHONE (TA-1)
needs no batteries



The WIRE DISPENSER (MX-306A).

Dough-nut shaped configuration.

Wire length: 800 meters of WD-1/TT
Weight: 26 pounds
Capable of providing continuous communications while laying wire.



Platoon "Hot Loop" (TA-1/PT-4) and WD- 1/TT.

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APPENDIX J

EMPLOYMENT OF OBSTACLES

1. GENERAL. The proper use of obstacles is one technique a maintenance company can employ to reduce its vulnerability to ground attack. An obstacle is any obstruction that stops, delays, or restricts movement. The movement to be stopped, delayed, or restricted is that of the tank. Threat forces rely primarily on the tank, and other equipment is designed to keep pace with the tank. Thus, the obstacles to be used to discourage assaults are those primarily that will work against the threat tank.

2. PURPOSE. The mission of the company is the primary determinant of its location of the battlefield. One of the factors in siting the unit is the defensibility of the location. As the commander analyzes his unit's location, he should determine what is there -- natural or cultural obstacles -- that he can utilize, and what his soldiers can do to improve the site. Obstacles are, therefore, divided into two categories -- existing and reinforcing obstacles. The company commander's problem will be how to improve (reinforce) the obstacles he has available to him. In siting reinforcing obstacles, they are carefully integrated with friendly fires and the scheme of defense, and with other reinforcing and existing obstacles. Thus, the primary purpose of obstacle use is to enhance the effectiveness of friendly fires.

3. TYPES. Obstacles that can be employed to increase the defensibility of a site are:

Natural or Cultural	Reinforcing
Drainage features	Demolition obstacles
Soil	Constructed obstacles
Vegetation	Land mines
Cultural features, such as stonewalls, dikes, hedgerows, built-up areas, towns, and cities	Contamination
	Expedient obstacles

4. PLANNING. The commander determines how best to use the terrain, his forces, and the support available to him. The following principles govern the employment of obstacles:

a. Reinforcing obstacles are integrated with observed fires. We have previously noted that obstacles enhance the effectiveness of direct fire. Generally, the greatest relative advantage occurs when the obstacle is at the greatest direct

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fire range consistent with visibility conditions and the tactical plan. Observed indirect fires, if available, should also be integrated.

b. Reinforcing obstacles are integrated with the scheme of maneuver (defensive plan). This principle has two parts. First, we want the obstacles to stop or delay, or force the enemy to move where we wish. Second, we must preserve our freedom to move and carry out the normal support functions.

c. Reinforcing obstacles are integrated with existing obstacles and with each other. An obstacle must be tied-in with natural or cultural obstacles or with each other. Another consideration is that an obstacle should be no more difficult to breach than it is to get around. A maintenance company will not have excess manpower for obstacle reinforcement, so don't spend time laying a minefield that can be bypassed in 5 minutes.

d. Reinforcing obstacles are employed in depth. A series of simple obstacles arranged one behind the other along a probable axis of advance is much more effective than one large obstacle. They must be far enough apart so that each one will require a new deployment of the enemy's counterobstacle forces along with his equipment. This will gain significant time for the defender.

e. Reinforcing obstacles are employed for surprise. Use of dynamic, hidden, dummy, and expedient obstacles contributes to surprise. Scatterable mines and other new land mine technologies allow commanders to create "instant" minefields. By varying the types, design, and location, the enemy's breaching of our obstacles is made more difficult.

5. ENGINEER ASSISTANCE. Company commanders can get assistance in obstacle planning from engineer units they are supporting. Priorities for engineer units are normally forward to maneuver units, but technical assistance and some special equipment may be available. The point is that the commander should ask for assistance rather than concede that no help will be provided.

6. SUMMARY. The simplest, easiest obstacle to prepare is the hasty protective minefield which is discussed in appendix K. Material and time will limit the other types of obstacles that can be established. The commander must personally select the obstacle site and type to maximize its effectiveness in his overall defensive plan. Careful selection of the maintenance unit location can decrease the need for reinforcing obstacles.

References: FM 5-34, Engineer Handbook. (Specific information on construction of various obstacles can be found in this manual.)
FM 90-7, Obstacles.

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APPENDIX K

EMPLOYMENT OF MINES

1. GENERAL. A maintenance company commander should utilize every possible means to generate more defensive combat power. A method of achieving this is to employ mine warfare. Mines are ammunition items that are available to the company either through its basic load or by other requisition means. The commander can use these weapons to his advantage if he has trained his unit in their employment.

2. POLICY. Mine warfare policy at each command level must meet the current concept of the operation, any known future mission, and the unit's capability. Commanders may limit the use of mines by subordinate units by telling them what types of mines they can use, where they can use mines, and the places that must be kept free of mines. This is especially true for combat service support (CSS) units operating in rear areas. Within these restrictions, however, commanders who are allowed to employ mines normally are permitted to use their own resources for their own local protection and for other areas directed by higher headquarters.

3. TYPES. The minefield that a maintenance company will employ is called a hasty protective minefield. A protective minefield is used to aid a unit in its local, close-in protection. Mines may be used to detect the approach of an enemy force and to prevent surprise. A guide to the composition of protective minefields is:

a. Use mines that are easy to detect. These include metallic antitank (AT) and antipersonnel (APERS) mines, flares, and improvised flame weapons.

b. Do not use chemical mines, antihandling devices, or mines hard to detect.

c. Place mines on the surface of the ground when laying hasty protective minefields.

d. The types and densities of mines used will vary. Consider these factors when making a decision:

(1) Main threat - tanks or infantry.

(2) Types of mines that meet threat best.

(3) Ground conditions.

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4. LAYOUT. The layout of hasty protective minefields is flexible. There are only five basic limits on how it can be done:

a. Where the mines are placed must be recorded with care and accuracy. This will permit the field to be picked up safely and quickly by the installing unit or any other unit assigned the task. Hasty protective minefields are recorded on DA Form 1355-1-R.

b. Mines must be metallic.

c. The field should be kept under observation or kept fenced in. This is to protect our troops and make sure that the enemy does not tamper with the field.

d. The mines should be covered by fire. Mines have little or no value unless the enemy is forced to stay in his vehicles.

e. Hasty protective minefields should be tied in with other obstacles.

5. REPORTS. Once the commander decides to establish a protective minefield, he has three required reports he must make to his commander:

a. Report of Intention (STANAG 2036), sent by secure means with the following information:

(1) Tactical purpose.

(2) Type of minefield.

(3) Estimated number and types of mines.

(4) Whether mines are surface laid.

(5) Whether antihandling devices are used.

(6) Minefield location.

(7) Location and width of lanes and gaps.

(8) Proposed date and time for starting and completion.

b. Report of Initiation, sent by secure means.

c. Report of Completion, sent by secure means. This is the actual minefield record (DA Form 1355-1-R). An informal report is made as soon as the field is completed if there will be any delay in getting the full report to the proper command.

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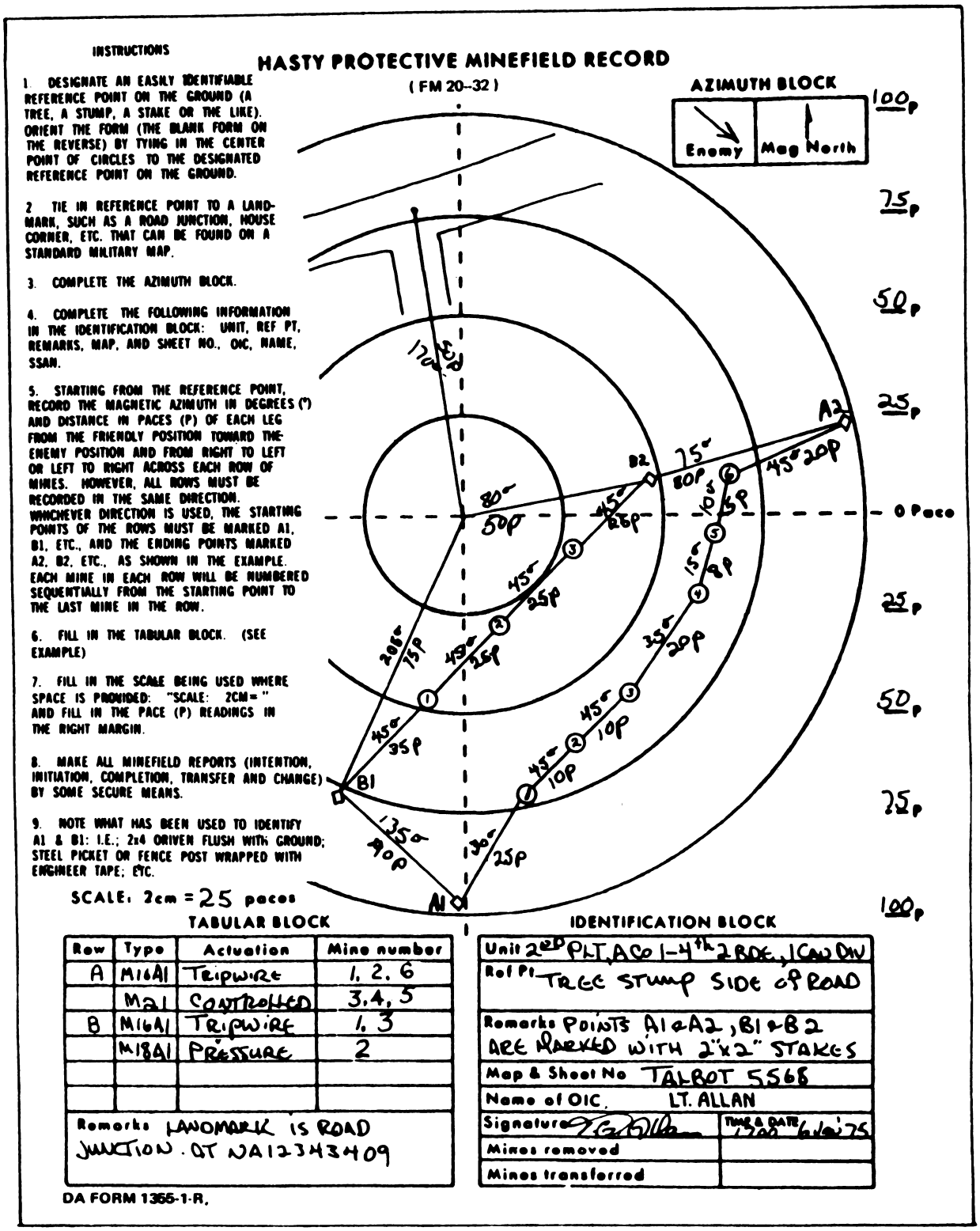
INSTRUCTIONS
1. DESIGNATE AN EASILY IDENTIFIABLE REFERENCE POINT ON THE GROUND (A TREE, A STUMP, A STAKE OR THE LIKE). ORIENT THE FORM (THE BLANK FORM ON THE REVERSE) BY TYING IN THE CENTER POINT OF CIRCLES TO THE DESIGNATED REFERENCE POINT ON THE GROUND.
2. TIE IN REFERENCE POINT TO A LANDMARK, SUCH AS A ROAD JUNCTION, HOUSE CORNER, ETC. THAT CAN BE FOUND ON A STANDARD MILITARY MAP.
3. COMPLETE THE AZIMUTH BLOCK.
4. COMPLETE THE FOLLOWING INFORMATION IN THE IDENTIFICATION BLOCK: UNIT, REF PT, REMARKS, MAP, AND SHEET NO., OIC, NAME, SSAN.
5. STARTING FROM THE REFERENCE POINT, RECORD THE MAGNETIC AZIMUTH IN DEGREES (°) AND DISTANCE IN PACES (P) OF EACH LEG FROM THE FRIENDLY POSITION TOWARD THE ENEMY POSITION AND FROM RIGHT TO LEFT OR LEFT TO RIGHT ACROSS EACH ROW OF MINES. HOWEVER, ALL ROWS MUST BE RECORDED IN THE SAME DIRECTION. WHICHEVER DIRECTION IS USED, THE STARTING POINTS OF THE ROWS MUST BE MARKED A1, B1, ETC., AND THE ENDING POINTS MARKED A2, B2, ETC., AS SHOWN IN THE EXAMPLE. EACH MINE IN EACH ROW WILL BE NUMBERED SEQUENTIALLY FROM THE STARTING POINT TO THE LAST MINE IN THE ROW.
6. FILL IN THE TABULAR BLOCK. (SEE EXAMPLE)
7. FILL IN THE SCALE BEING USED WHERE SPACE IS PROVIDED: "SCALE: 2CM = " AND FILL IN THE PACE (P) READINGS IN THE RIGHT MARGIN.
8. MAKE ALL MINEFIELD REPORTS (INTENTION, INITIATION, COMPLETION, TRANSFER AND CHANGE) BY SOME SECURE MEANS.
9. NOTE WHAT HAS BEEN USED TO IDENTIFY A1 & B1: I.E.; 2x4 DRIVEN FLUSH WITH GROUND; STEEL PICKET OR FENCE POST WRAPPED WITH ENGINEER TAPE; ETC.
HASTY PROTECTIVE MINEFIELD RECORD
(FM 20-32)
AZIMUTH BLOCK
Enemy
Mag North
100P
75P
50P
25P
0 Paces
25P
50P
75P
100P
A2
B2
B1
A1
120° 50P
80° 50P
75° 80P
45° 20P
45° 25P
45° 25P
45° 25P
15° 8P
35° 20P
45° 10P
45° 10P
45° 35P
135° 90P
30° 25P
SCALE: 2cm = 25 paces
TABULAR BLOCK
Row | Type | Actuation | Mine number
A | M16A1 | Tripwire | 1, 2, 6
| M21 | CONTROLLED | 3, 4, 5
B | M16A1 | TRIPWIRE | 1, 3
| M18A1 | PRESSURE | 2
Remarks LANDMARK IS ROAD JUNCTION. GT NA1234 3409
IDENTIFICATION BLOCK
Unit 2ND PLT, A Co 1-4TH 2 BDE, 1 CAV DIV
Ref Pt TREE STUMP SIDE OF ROAD
Remarks POINTS A1 & A2, B1 & B2 ARE MARKED WITH 2"x2" STAKES
Map & Sheet No TALBOT 5568
Name of OIC LT. ALLAN
Signature
Time & Date 7500 6 Mar 75
Mines removed
Mines transferred
DA FORM 1355-1-R.

Figure K-1. Hasty protective minefield record (DA Form 1355-1-R).

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6. REMOVAL. The best way to remove a hasty protective minefield is to have each soldier who installed a mine pick up that same mine. When this can be done, removal is a process of picking up what was laid out a day or two before and kept under observation during that time. If this cannot be done, the record is used to locate the mines. If it is possible that the mines could have been tampered with, each one is uncovered and pulled out with a rope or wire. Upon being removed from a field, all mines will be disarmed, cleaned, and repacked for future use. Repack the mines in original cases and cans to keep them functional and safe until their next use.

7. TRAINING POINTS. The company commander, to make hasty protective minefields a viable part of his unit's defense, has certain responsibilities:

a. He must know when he is permitted to lay mines and what his responsibilities are after the installation is completed.

b. He maintains his authorized basic load of mines. If mines are not authorized, he must know where to obtain mines when needed.

c. He trains his unit to handle all standard mines, fuzes, and flares, and checks the training of all replacements in mine warfare.

d. He bases his use of mines, in the absence of specific orders, on his mission and avoids employment which interferes with the accomplishment of his mission or the mission of other units.

e. He enforces mine discipline and insures that mines are handled, laid, removed, and recorded in the prescribed manner. He adheres to established doctrine and, when necessary, he uses imagination and initiative to fabricate field expedients.

f. He insures that his command knows how to mark, secure, and maintain a minefield; prepare the required reports and records; and that relieving units are given full information of any minefields or mining for which he has responsibility.

8. SUMMARY. The mines that a maintenance company should employ for its defense are the M16 antipersonnel mine, the M18 Claymore mine, and the M21 antitank mine. These mines are easy to install, remove, and are extremely effective. A guide to these and other mines is shown at figures K-2 thru K-6.

References: FM 7-7, Mechanized Infantry Platoon and Squad.
FM 20-32, Mine/Countermine Operations at Company Level.
TM 9-1345-200, Landmines. (Furnishes more information on all mines.)

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Your platoon has been tasked to install a hasty protective minefield -- a minefield employed and constructed by a unit for its own close-in protection that will be taken up when the unit moves. The platoon leader has given this mission to your squad along with guidance where the mines are to be placed. You have been provided three antitank mines (M21), five antipersonnel mines (M16A1) with tripwires, and one Claymore (M18A1) from the company basic load.

FOR TRAINING

Plastic versions of each mine depicted are available through TASO in either an inert or a casualty-assessing mode.

NOTES

1. Use only metallic mines in protective minefields. If the mines cannot be found when the field is removed by hand, use a metallic mine detector (AN/PSS-11) to help find the lost mines.

2. Do not use boobytraps in protective minefields as these devices will seriously delay removal of the minefield.

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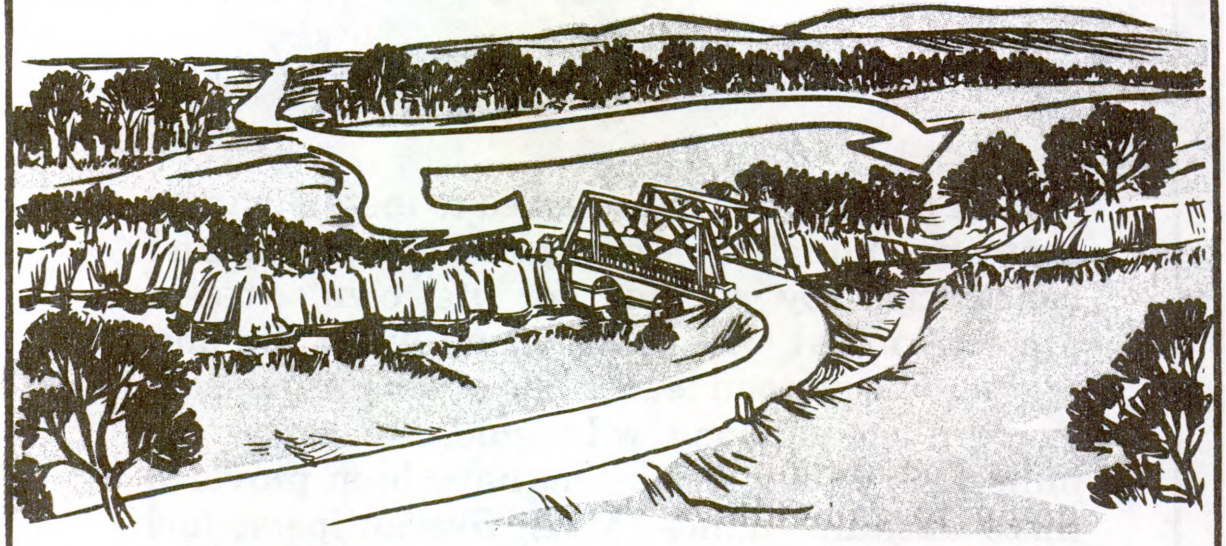
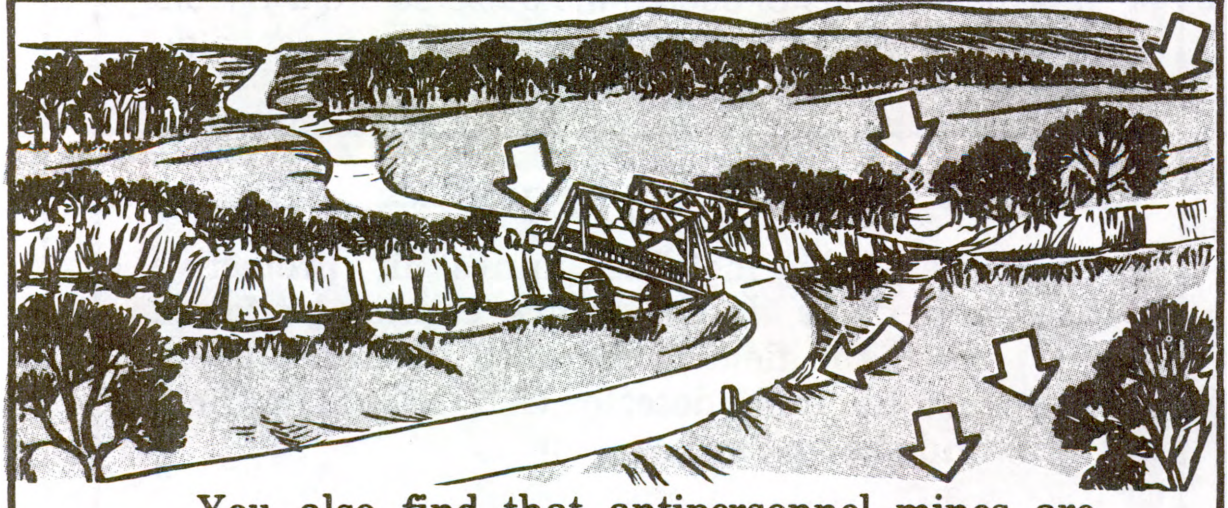


You and your team leaders make a ground reconnaissance and identify points where tanks can cross the area you have been directed to mine -- the bridge and the ford.



You also find that antipersonnel mines are needed to protect the antitank mines and to cover the likely avenues of approach for enemy infantry. AP mines are also good for the open area in front of your platoon.

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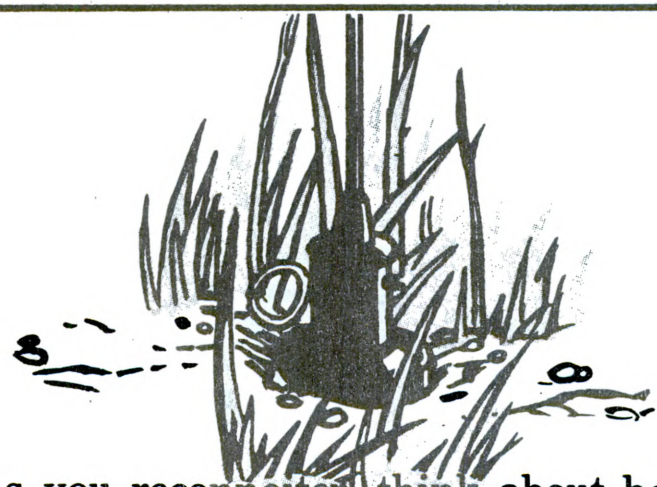
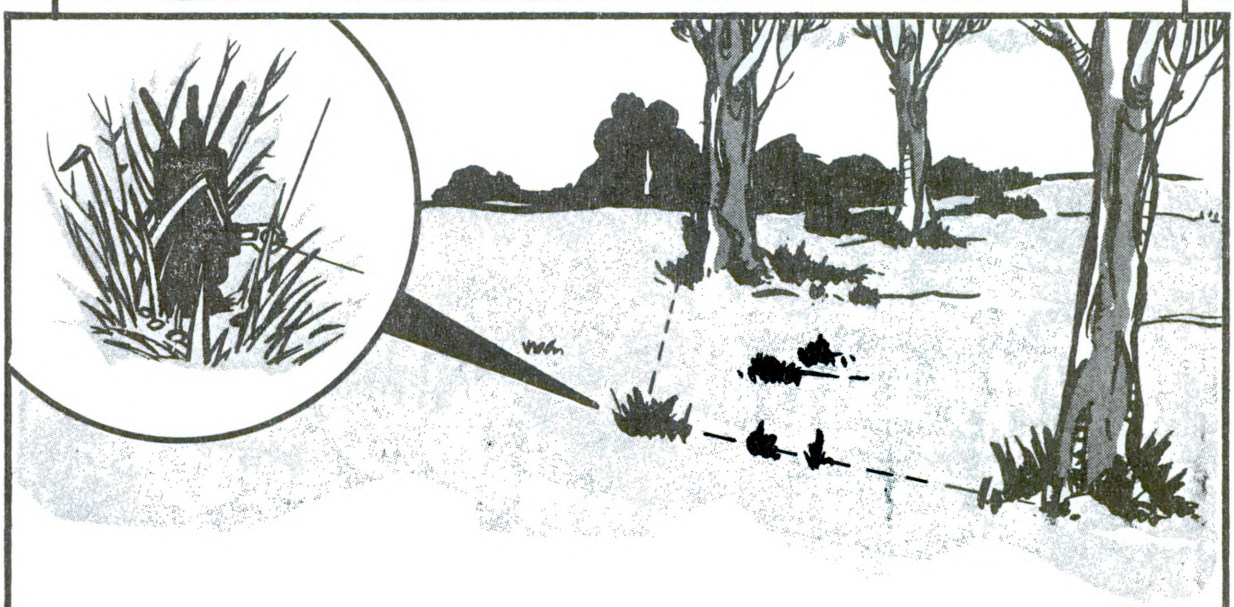


As you reconnoiter, think about how you are going to camouflage the mines. Bury the M21 antitank mines with only the tilt rod exposed. This rod can be camouflaged with brush or tall grass.



The M16A1 antipersonnel mines can be buried and the tripwires camouflaged with grass or leaves.

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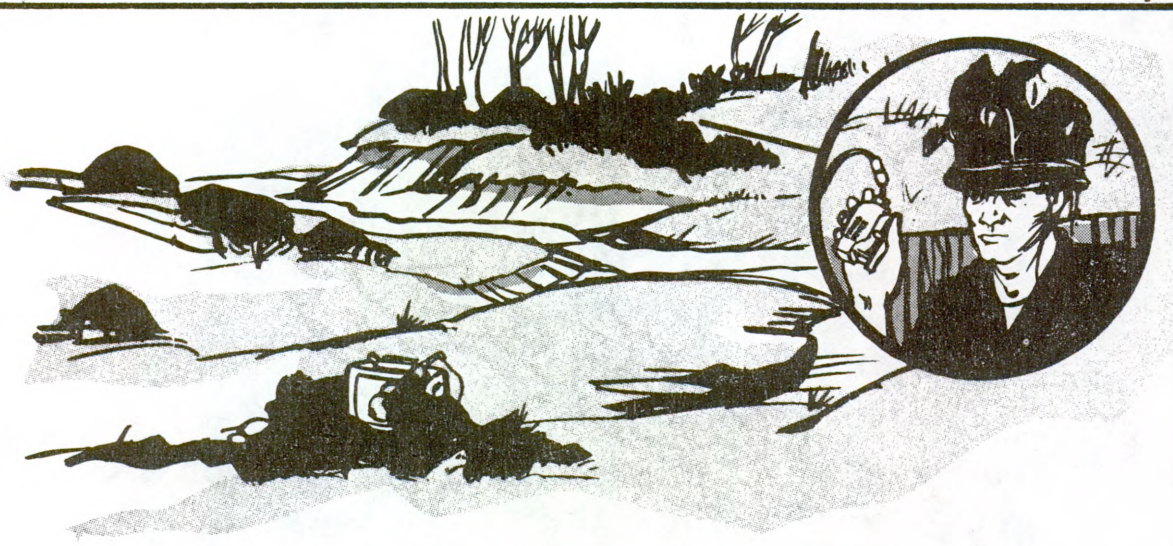
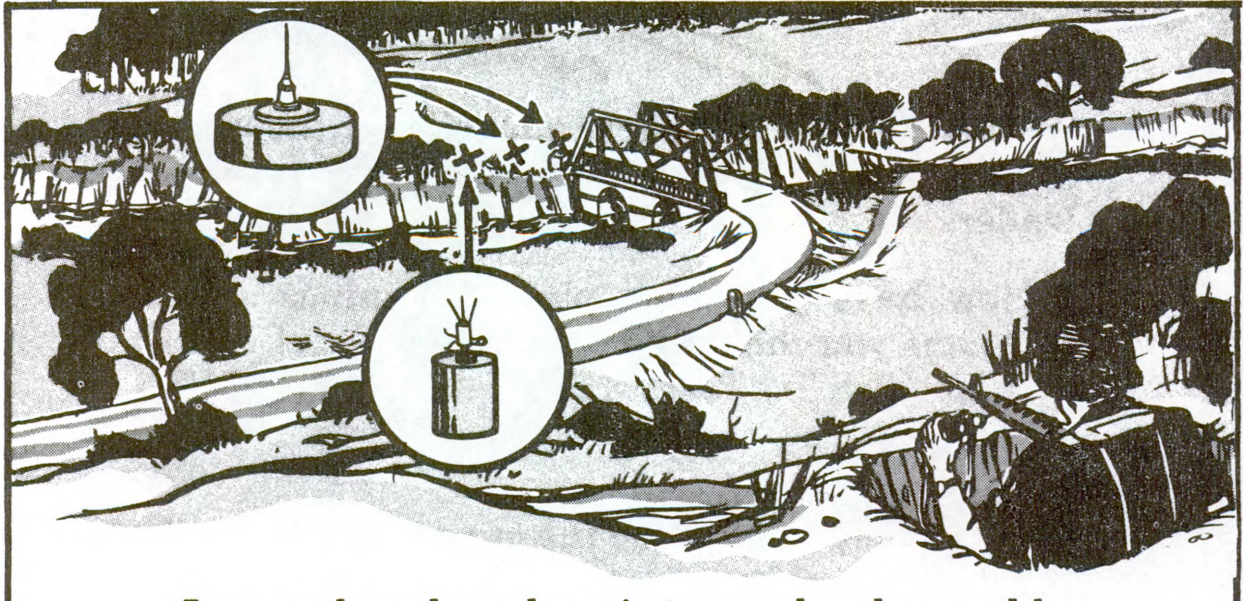


The Claymore mine and firing wire should be camouflaged using grass or leaves also.



Insure that these locations can be observed by your troops at all times as continuous observation can keep the enemy from moving or boobytrapping your mines.

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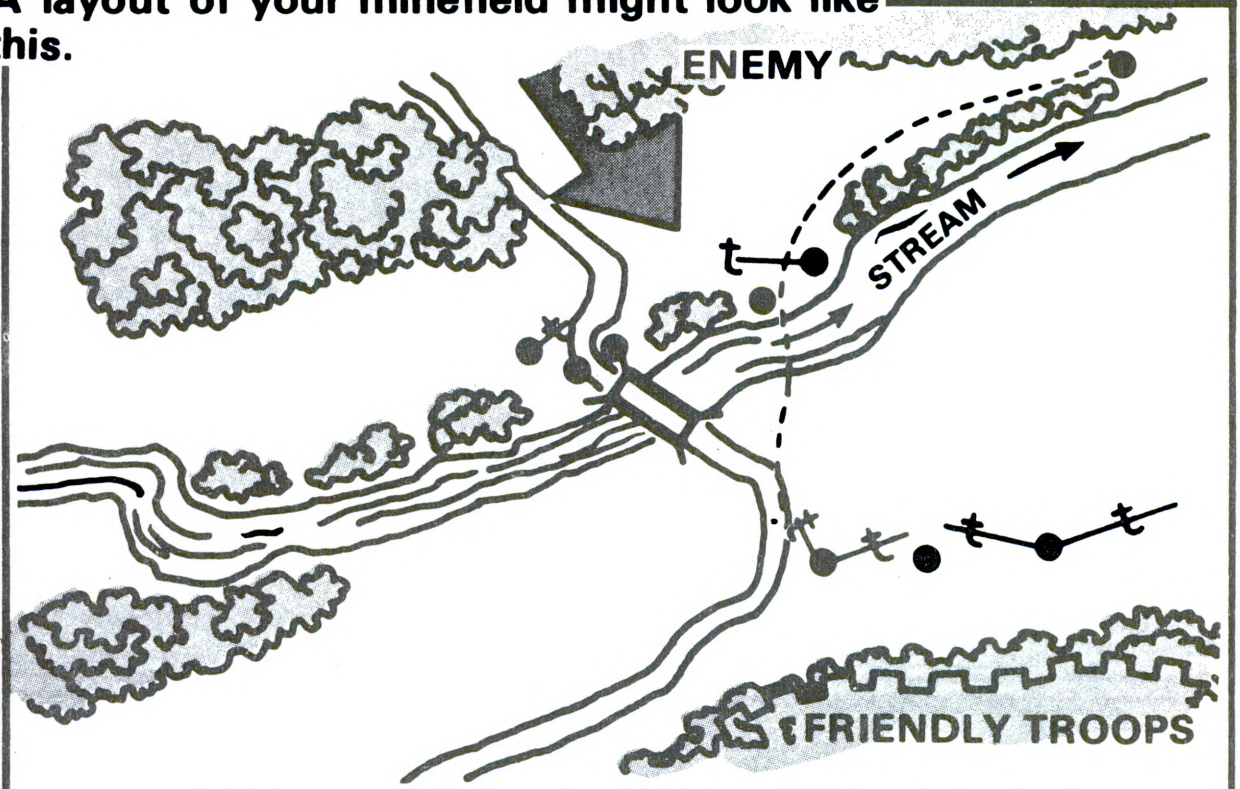
A layout of your minefield might look like this.



When you decide where you will lay the mines and are ready to begin, inform your platoon leader.

Now have your men place the mines at the locations you chose. DO NOT ARM OR ATTACH TRIPWIRES TO THE MINES AT THIS TIME.

While they are placing the mines, find an easily identifiable reference point in front of your position. The concrete post to your front is an ideal reference point; you begin recording the field.

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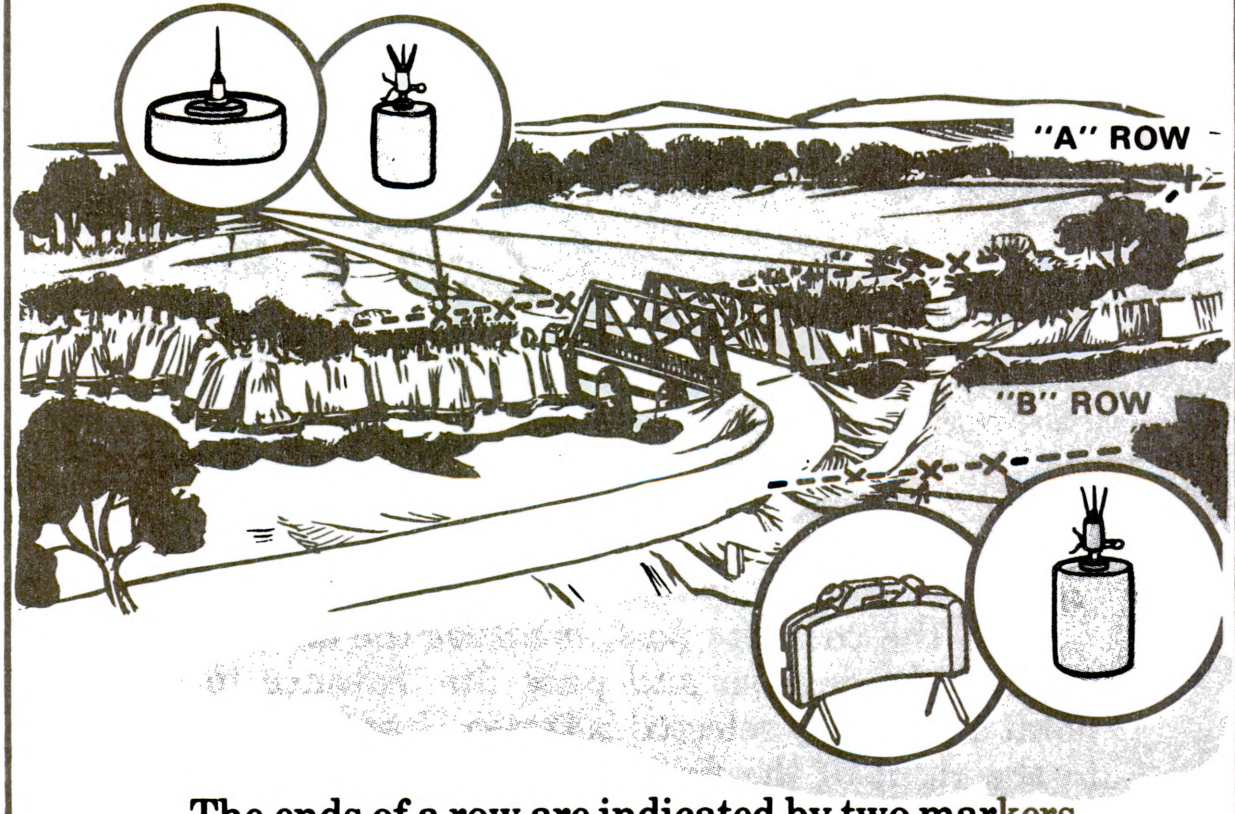
At the reference point, mentally visualize your field, running in rows, parallel to your position. This will make the recording simpler and will later make retrieval quicker and safer. By STANO/ STANAG agreements, the row closest to the enemy will be designated A while succeeding rows will be B, C, etc. For this hasty protective minefield, you decide that two rows will be enough.



The ends of a row are indicated by two markers. These markers are labeled with the letter of the row and the number 1 for one end of the row and 2 for the other end of the row. The marker could be a wooden stake, steel picket, etc.

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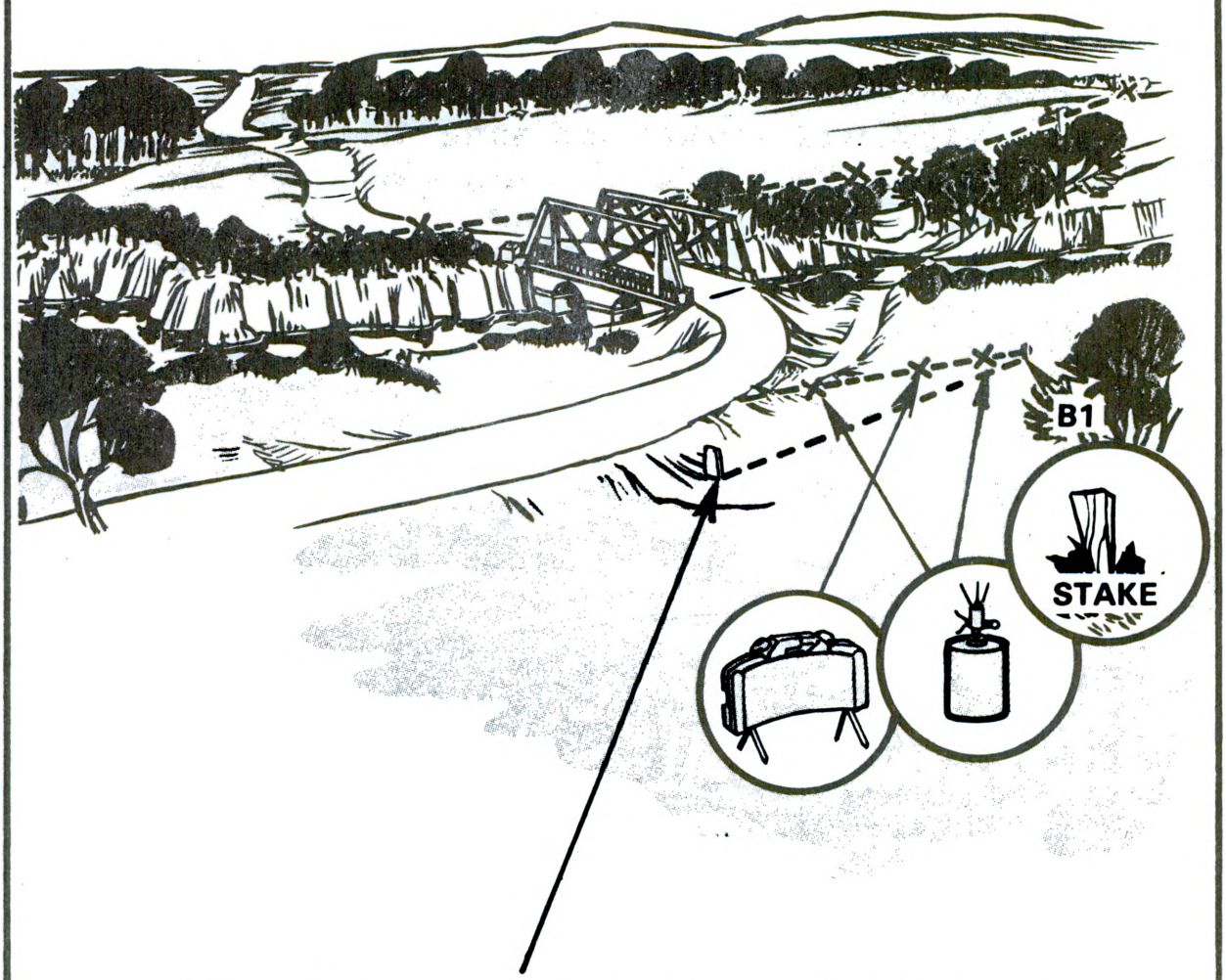

From the concrete post, measure the magnetic azimuth in degrees and pace the distance to a point arbitrarily selected between 15 and 25 paces to the right of the first mine. This point will be called B-1 and will mark the beginning of the second row. Place a marker at B-1 and record the azimuth and distance on DA Form 1355-1-R.

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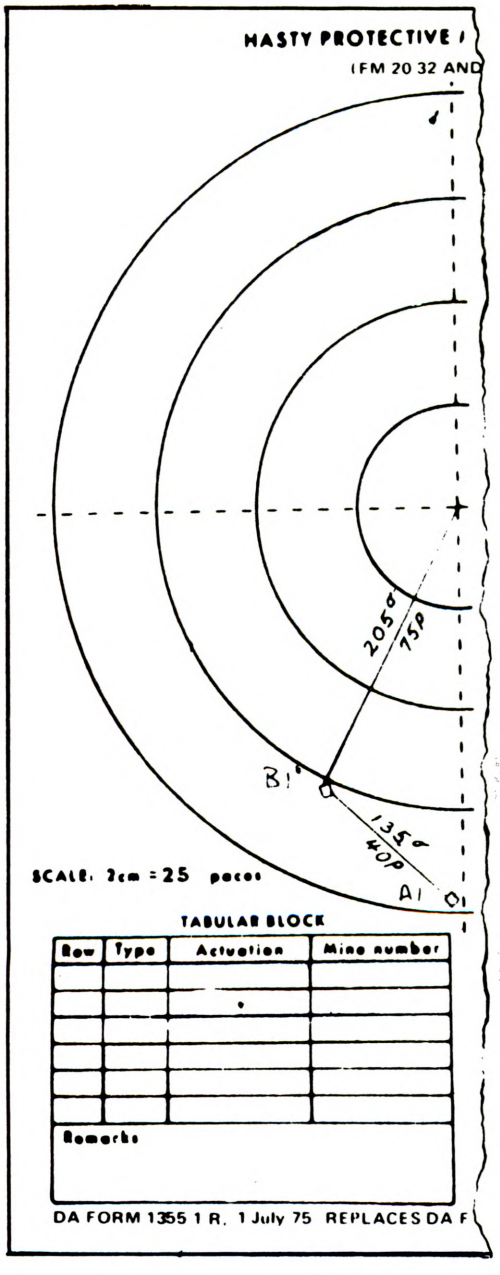

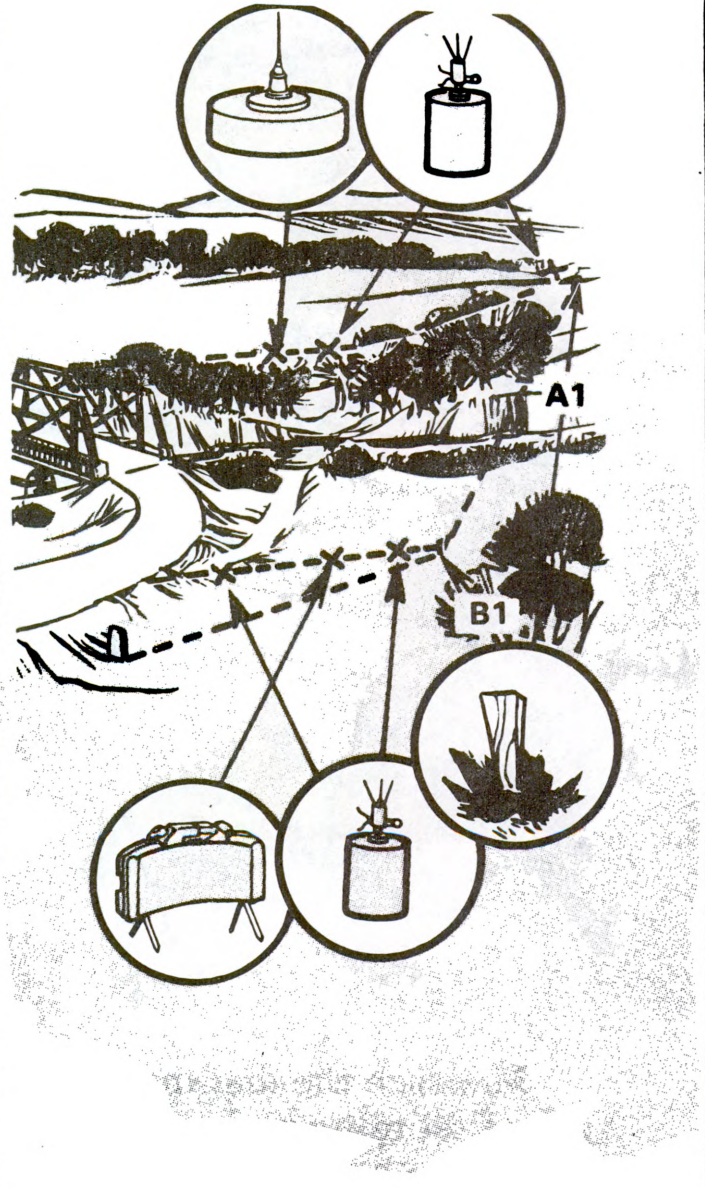

Now measure the azimuth and distance to a point 15 to 25 paces from the first mine in A row. Place a marker at this point and record it as A-1.

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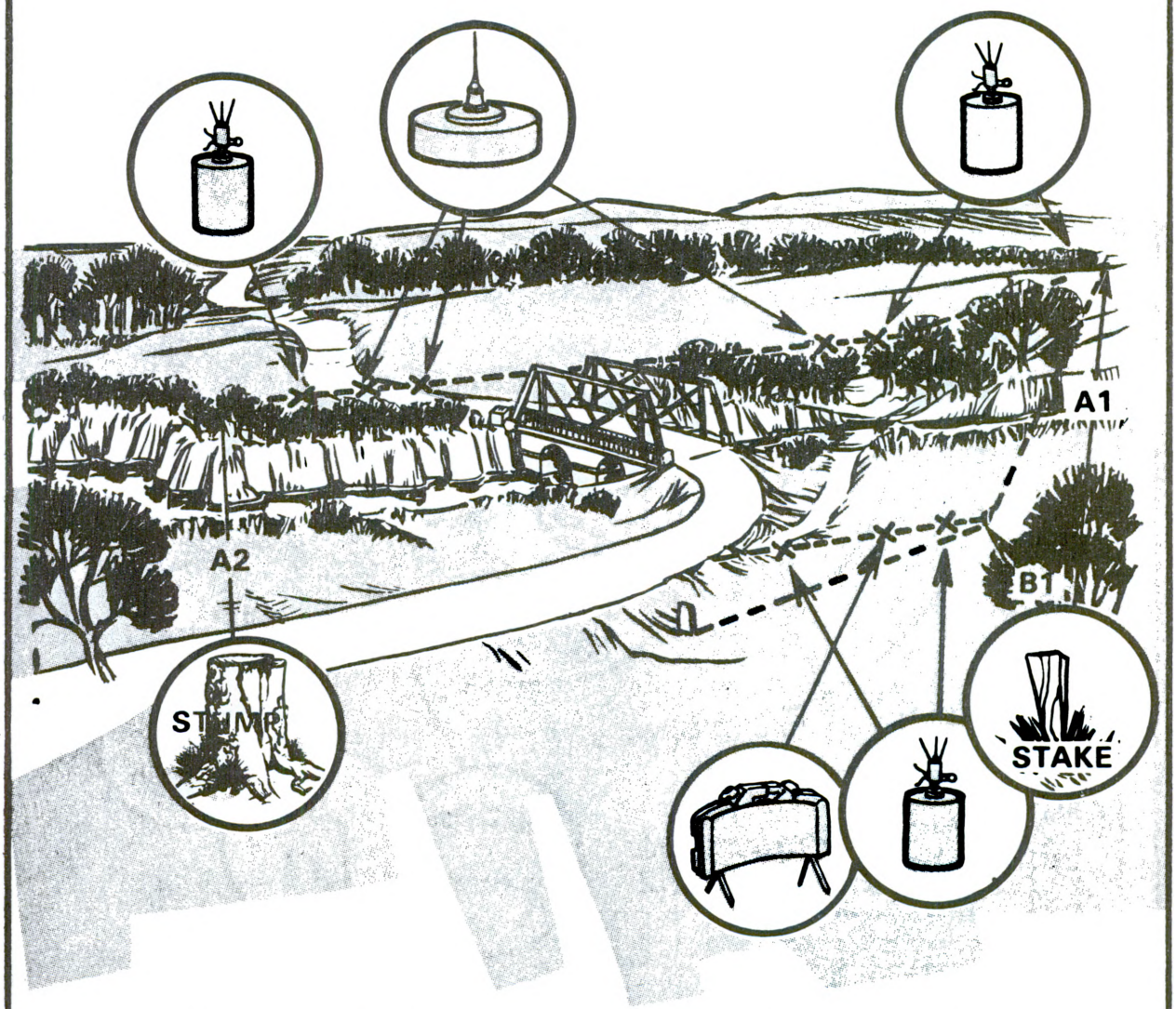

Measure the distance and azimuth from A-1 to the first mine and record them. Then measure the distance and azimuth from the first mine to the second, and so on until all mine locations have been recorded as shown. Repeat this procedure for the second row.

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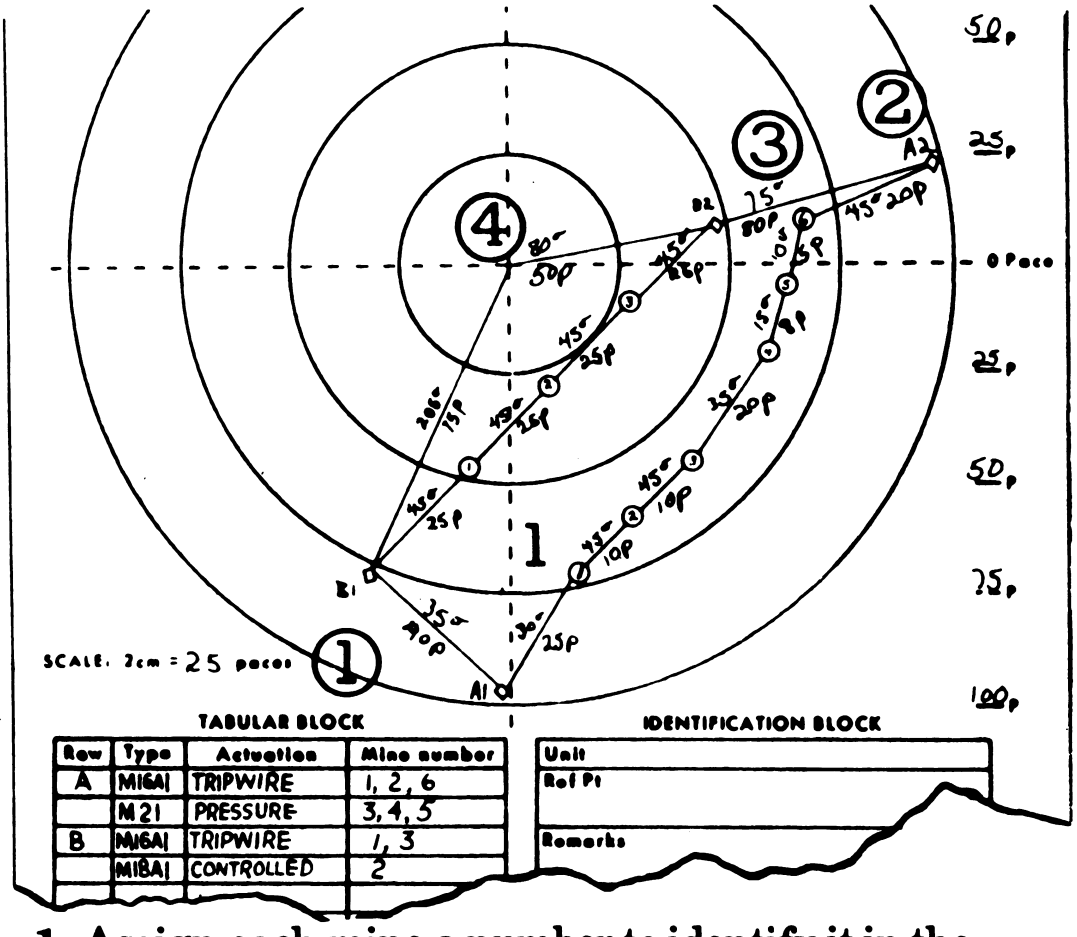
Your form should now look like this



1. Assign each mine a number to identify it in the tabular block.

2. When the last mine location is recorded, an azimuth and distance are measured from that point to another arbitrary point, A-2 and B-2. Here a marker is placed as at A-1 and B-1.

3. Now measure the distances and azimuths from the reference point to B-2, and from B-2 to A-2, and record them.

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4. When you retrieve the mines, start at the reference point and move to B-1 using the azimuth and distance as recorded. Then move from B-1 to the mine. However, if B-1 is destroyed, move from the reference point to B-2 using that azimuth and distance. You will now have to shoot the back azimuth from B-2 to the last mine, i.e., add or subtract 180 degrees from the recorded azimuth. The stakes at A-1, B-1, A-2 and B-2 are necessary because it is safer to find a stake when traversing long distances, than to find a live mine.

Now tie in the reference point with a permanent landmark that can be found on your map. Measure the distance and azimuth from this landmark to the reference point. The landmark might be used to help others locate your minefield should it be abandoned. Finally, complete the tabular and identification blocks. Your completed form should look like the form on the next page.

While you are tying in the landmark, your men can arm the mines. Arm the mines nearest the enemy first, letting your men work their way back to the platoon position safely.

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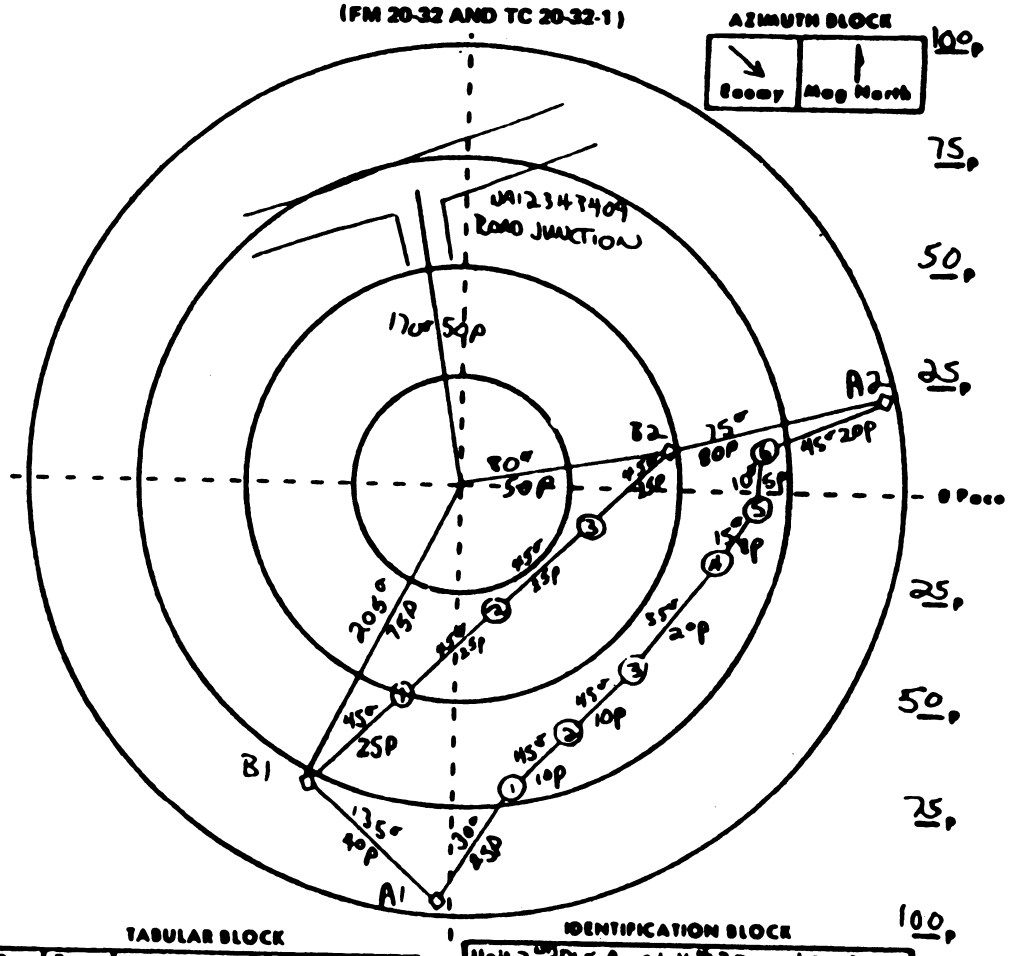
HASTY PROTECTIVE MINEFIELD RECORD

(FM 20-32 AND TC 20-32-1)



TABULAR BLOCK

Row	Type	Actuation	Mine number
A	M18A1	TRIPWIRE	1, 2, 6
	M21	PRESSURE	3, 4, 5
B	M18A1	TRIPWIRE	1, 3
	M18A1	CONTROLLED	2

Remarks: LANDMARK IS ROAD JUNCTION AT VA1234 3409

IDENTIFICATION BLOCK

Unit: 2nd Bn, A Co, 1-4 IN, 2 BDE, 1 CAV DIV	
Co: Concrete post side of road	
Remarks: POINTS A1-A2, B1-B2 ARE MARKED WITH 2 x 2 STAKES	
Map & Sheet No: TALBOT 5568	
Name of OIC: LT ALLAN	
Signature:	Time & Date: 1500A 4 NOV 75
Mines removed	
Mines transferred	

DA FORM 1355-1-R, 1 July 75 REPLACES DA FORM 1355-1, 1 Mar 68 WHICH IS OBSOLETE

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COMPLETION REPORT

When the minefield is laid and charted, report to the platoon leader that you have completed the field. When you return to the platoon, give the platoon leader the copy of DA Form 1355-1-R you have completed.

In summary, here are the steps for installing a hasty protective minefield.

- **Insure you understand where you are to place the minefield.**
- **Reconnoiter. Find the best places for the mines based on where the enemy is likely to come and your platoon's ability to keep the mines under observation.**
- **Inform the platoon leader you are placing the mines.**
- **Place the mines but do not arm them.**
- **Record the minefield on DA Form 1355-1-R.**
- **Arm the mines, working from the enemy side to the friendly side.**
- **Report completion of the minefield.**
- **Give the DA Form 1355-1-R to the platoon leader when you return to your platoon.**

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M14 BLAST ANTIPERSONNEL MINE

Wt ..... 3 1/3 oz.
Explosive ..1 oz. TETRYL
Fuze ..... integral (with Belleville Spring)
Functioning 20 to 35 lb.
Penetrate Boot & Foot

Unscrew shipping plug from bottom of mine. Turn pressure plate to ARMED position with arming tool.

Remove safety clip and check for malfunctioning.

Replace safety clip.

Screw detonator into detonator well.

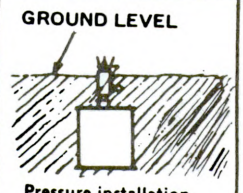
Bury mine and remove safety clip.

TO BURY: Pressure plate should be slightly above ground level.
TO DISARM: Insert safety clip and remove detonator.
CAUTION: Repeated turning of arming dial may cause excessive wear.

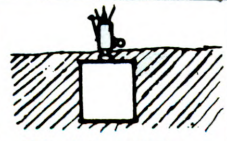
M16A1 BOUNDING ANTIPERSONNEL MINES

Wt ..... 8.25 lb.
Projectiles ..... Steel
Fuze ..... M605 (Combination)
Functioning:
Pressure ... 8 to 20 lbs
Pull ..... 3 to 10 lbs
Bounding Ht .6–1.2m
Casualty radius..... 30m

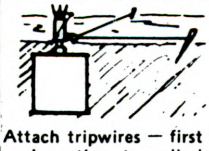
Remove shipping plug and screw in fuze.



Pressure installation



Tripwire installation

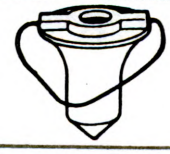


Attach tripwires — first to anchor, then to pull ring.

Remove locking safety pin first. The interlocking pins should fall free. Then remove positive safety.

TO DISARM: Reverse arming procedure.

M25 BLAST ANTIPERSONNEL MINE (ELSIE)



Wt ..... 2 3/4 oz.
Explosive ... 1/3 oz. shape charge
Fuze .....integral (w/ball release)
Functioning.. 14 to 26 lbs
Penetrate Boot & Foot

Push mine into ground. Keep dust cap in place. If ground is hard, dig hole with bayonet.

Remove dust cap.

Insert charge.

Remove safety clip.

TO DISARM: Reverse arming procedure.

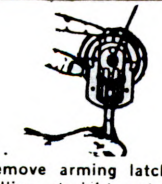
M26 ANTIPERSONNEL MINE

Wt .....2.2 LBS
Projectiles ..... Pellets
Fuze ..... integral
Functioning:
Pressure .... 14–28 lbs
Pull ..... 4–8 lbs
Bounding Ht 3m
Casualty Radius 17m

Remove arming handle. (If tripwire is to be used install trip-lever; attach slack wire to lever; and) place mine in ground flush with top of ground.

Remove arming latch retaining pin.

Attach arming handle to lugs on arming latch, rotate the cover clockwise until it comes to a positive stop (the arrow will point to the red letter "A" armed).



Remove arming latch by pulling straight out with the arming handle.

TO DISARM: Reverse arming procedure.

NOTE: ALL MINES MUST BE COMPLETELY CAMOUFLAGED TO BE EFFECTIVE.

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M18A1 FRAGMENTATION ANTIPERSONNEL MINE

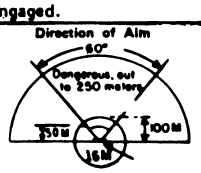
Wt ..... 3.5 lbs.
Explosive ..... 1.5 lb. C4
Projectiles ..... 700 (steel balls)
Equipment: One electric cap 30m firing wire per mine. One electric firing device per mine. One Tester per 6 mines.

TEST CIRCUIT: Mate firing device, circuit tester and blasting cap. Depress handle. Light should show in window. Separate test components.

AIMING: IN AIMING THE M18A1, WHEN USING THE SLIT TYPE PEEP SIGHT, AIM THE MINE AT AN INDIVIDUAL'S HEAD WHEN STANDING 45M FROM THE MINE. WHEN USING THE KNIFE EDGE SIGHT, AIM THE MINE AT AN INDIVIDUAL'S FEET WHEN STANDING 50M FROM THE MINE.

Remove shipping plug-priming adapter, insert blasting cap and screw into either cap well.

Unroll firing wire and connect directly to firing device with safety engaged.

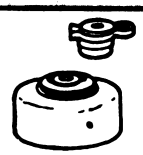


FIRING POSITION: A minimum of 16 meters from rear of mine to fox hole. Friendly troops at side and rear should be under cover at a minimum of 100 meters.

TO FIRE: Disengage safety bail and depress handle.

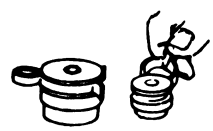
TO DISARM: Reverse arming procedure.

M15 HEAVY ANTITANK MINES



Wt ..... 30 lbs.
Explosive ..... 22 lbs.
Fuze M603
Secondary fuze wells ... 2
Functioning:
300 to 400 lbs.

Remove plug and inspect fuze well.



Inspect fuze and remove safety.

Insert fuze

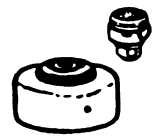
Replace plug with dial in safe position.

Turn dial to ARMED.

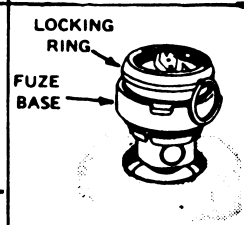
TO BURY: Put mine in hole with pressure plate at or slightly above ground level.

TO DISARM: Reverse arming procedure.

M15 ANTITANK MINE USED WITH M608 FUZE

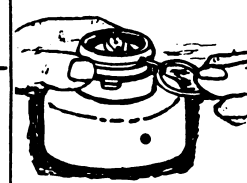


Functioning ....200-350 lbs for 250-450 milliseconds.
Resistant to blast type countermeasures.



Remove plug and inspect fuze well. Insure fuze is in SAFE position. Thread fuze into mine.....HAND TIGHT

Hold fuze to prevent rotating, turn locking ring down until it locks against pressure plate.

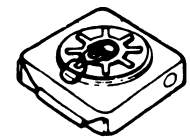


Place mine in hole and remove pull pin from fuze.

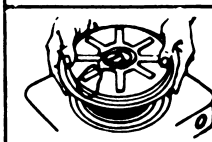
Turn dial from SAFE to ARMED.

TO DISARM: Reverse procedure except DO NOT replace pull pin.

M19 PLASTIC HEAVY ANTITANK MINE

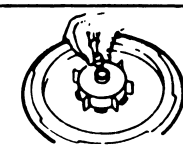


Wt ..... 28 lbs.
Explosive ..... 21 lbs.
Fuze .....M606 integral (with pressure plate)
Secondary fuze wells ... 2
Functioning:
350 to 500 lbs.

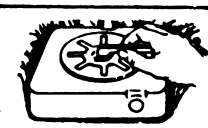


Remove pressure plate-fuze.

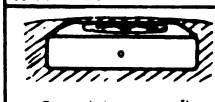
Remove shipping plug; check position of striker (offset). Remove safety fork, then turn dial to ARMED position. Check position of striker (center). Turn to SAFE and replace safety fork.



Screw threaded detonator into detonator well.



Place mine in hole, remove safety fork; and turn dial to ARMED.



Complete camouflage

TO BURY: Put mine in hole with pressure plate at or slightly above ground level.

TO DISARM: Reverse arming procedure.

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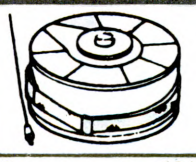
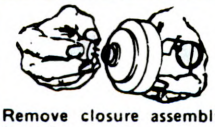
M24
OFF-ROUTE ANTITANK MINE



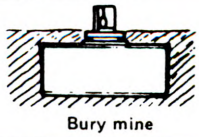
Wt ..... 18 lbs.
Explosive ..... 10.5 lbs.
Fuze M607
Functioning ..... 290 lbs.
(Pressure or pressure ring or 20° deflection of tilt rod)

Remove closing plug, insert M120 booster in bottom, and replace closing plug.



Remove closure assembly from fuze.

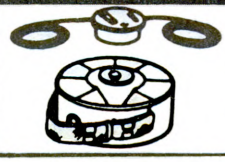
Remove shipping plug from mine and screw in fuze, then screw in tilt rod extension.



Bury mine

Remove safety (pull ring assembly) and complete camouflage.

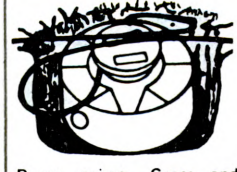
For pressure type mine bury with fuze cap flush with ground surface.
Tilt Rod-mines should be seated firmly in snug-fitting hole. Most effective in tall brush or grass.
TO DISARM: Reverse arming procedure.



Has two 2.7m pneumatic leads, safety latch and arming lever.

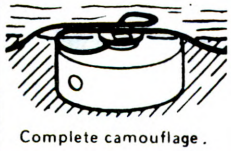
Remove closing plug, insert M120 booster.

Remove shipping plug from mine. Screw in fuze.



Bury mine. Cross and extend hoses.

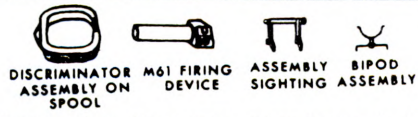
Lift safety latch and turn arming lever to ARMED. Recross hoses.



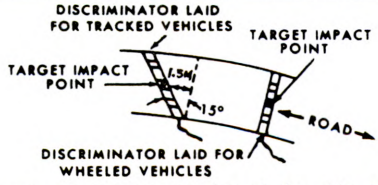
Complete camouflage.

Timer provides a 30 ± 5 minute safe separation period. Both leads must be depressed for initiation.
TO DISARM: Reverse arming procedure.

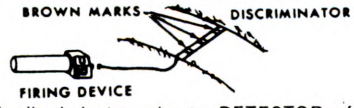
INSTALLING AND ARMING



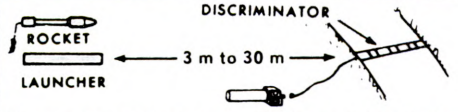
Remove above items from accessories pouch. Insert batteries (issued separately) in firing device.



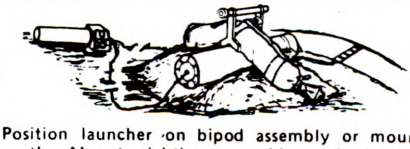
Unreel discriminator starting at far side of road (perpendicular to edge for wheeled vehicles; about 15° from perpendicular for tracked vehicles).



Attach discriminator wire to DETECTOR of firing device (toggle switch on SAFE). Stand on two brown marks on discriminator nearest firing device. If lamp lights, circuit is good; otherwise, discard system.



Disconnect discriminator wire from firing device. Remove launcher from dispenser pouch and place in position. Remove packing blocks, push rocket forward to safety band, and remove band. Depress ejection pin and push rocket back into launcher until contact ring is exposed at base. Grounding clip must be connected. Remove tagged shorting clip and push rocket back into launcher. Tape plastic covers over ends of launcher.



Position launcher on bipod assembly or mound of earth. Mount sighting assembly and sight along discriminator to target impact point about 1m above road (soldier's belt buckle.) To aim, move launcher, not sight. Fill poucher with dirt, lay over launcher, recheck sight, remove sight, re-connect discriminator wire to firing device (light out), connect rocket cable to firing device, and push toggle switch to ARM. The system is now armed and will fire when pressure is applied to the discriminator. See TM 9–1345–200.

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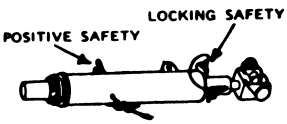
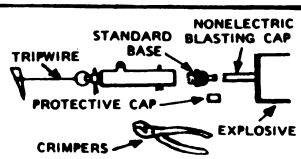
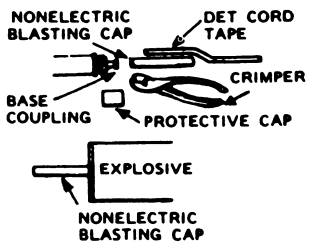
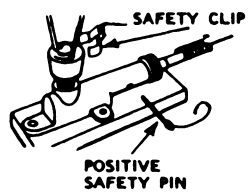
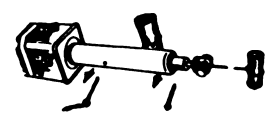
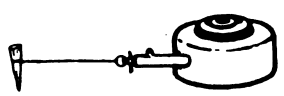
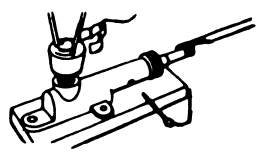
M1 PULL FIRING DEVICE	M1A1 PRESSURE FIRING DEVICE	M3 PULL-RELEASE FIRING DEVICE
 INITIATING ACTION: 3 to 5 lb pull on tripwire.	 Initiating pressure: 10 lbs or more.	
 Remove protective cap from standard base and crimp on nonelectric blasting cap. Attach firing device assembly to charge. Attach anchored tripwire.	 Remove protective cap from base and crimp on nonelectric blasting cap. Assemble det cord, nonelectric blasting cap, and firing device.	 Remove protective cap and crimp on a nonelectric blasting cap. Attach firing device assembly to anchored charge (must be firm enough to withstand pull of at least 6-10 lbs. pull on tripwire). Put free end of anchored tripwire in hole in winch with knurled knob, draw up tripwire until locking safety is pulled into wide part of safety pin hole.
 TO ARM: Remove locking safety pin first, and positive safety pin last.		
 TO DISARM: Insert nail, length of wire or original safety pin in positive safety pin hole first. Then insert similar pin in locking safety pin hole. Cut tripwire, and separate firing device and expolsive. Unscrew standard base.	 TO ARM: Remove safety clip. Then positive safety pin.	 TO ARM: With cord, remove small cotter pin from locking safety pin, and withdraw locking safety pin. If it does not remove easily, adjust winch winding. With cord, pull out positive safety pin.
 The M1 pull firing device can be used as an antihandling device on the M15 or M19 AT mines. The arming procedures are the same as above. The device is employed in the side fuze well and a tripwire attached from the M1 to a stake secured underground near the mine.	 TO DISARM: Insert wire, nail, original pin in positive safety hole. Replace safety clip, if available. Unscrew base assembly from firing device.	TO DISARM: THE M3 IS DANGEROUS TO DISARM. IT SHOULD BE BLOWN IN PLACE. NOTE: If the device must be disarmed proceed as follows: Insert length of wire, nail or original pin in positive safety pin hole first. Then insert length of wire, nail or original locking pin in locking pin hole. Disassemble tripwire, firing device and explosive.

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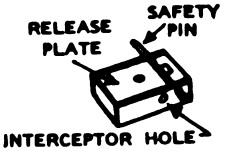
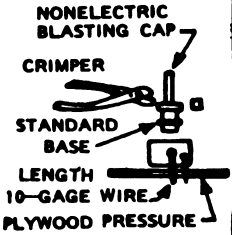
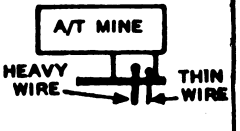
M5 PRESSURE-RELEASE FIRING DEVICE



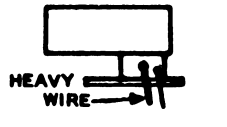
INITIATING ACTION: Lifting 1.59cm or removing restraining weight (5lb or more).



Insert length of 10-gage wire in interceptor hole and holding release plate down, remove safety pin. Replace safety pin with length of No. 18 wire. Assemble cap, firing device and mine.

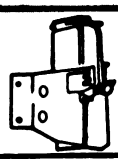


TO ARM: Remove thin wire (locking safety) and then heavy wire (positive safety) from interceptor hole. FOLLOW ARMING PROCEDURE CAREFULLY.



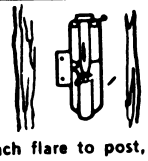
TO DISARM: Insert length of heavy gage wire in interceptor hole. Bend wire to prevent dropping out. Proceed carefully, as the slightest disturbance of restraining weight may detonate mine. Disassemble firing device and mine.

M49A1 TRIP FLARE

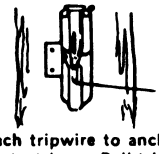


Burning period .... 55 to 70 sec
Illumination radius 300m

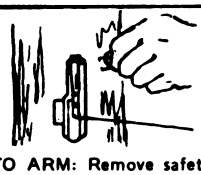
Initiated by taut or loose tripwire.



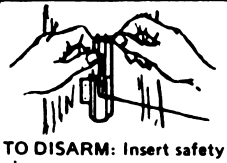
Attach flare to post, tree, etc.



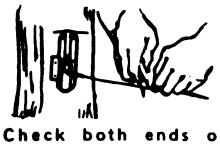
Attach tripwire to anchor, then to trigger. Pull trigger to vertical position and secure.



TO ARM: Remove safety clip.



TO DISARM: Insert safety pin.



Check both ends of tripwire and cut near trigger.

WARNING: Never look directly at burning flare. Note: For loose tripwire initiation, attach tripwire to eye of safety pin.

HASTY PROTECTIVE MINING

1. Hasty protective minefields are generally laid by small unit commanders at outposts, work sites, bivouac areas, or ambush sites. They may also supplement manned weapons, prevent tactical surprise, or give early warning of enemy advance.

2. Mines should be readily detectable and removable and be sited across likely avenues of approach within range of organic weapons and visual observation.

3. Depending on the situation, the field should be marked by signs or fences or have guards to warn friendly troops.

4. The hasty protective minefield should be recorded on DA Form 1355-1 (page 8). If not available a form should be improvised. The unit that installs the field should warn adjacent units if possible, and inform higher headquarters. This unit must remove the field before leaving the area or transfer the responsibility to the relieving unit commander.

RULES FOR A STANDARD PATTERN MINEFIELD

TRIPWIRES:

1. No tripwires in the IOE.
2. Tripwires employed on the enemy side of the strip only.
3. No more than two tripwires per cluster.
4. No more than one tripwire mine per cluster.
5. Tripwires no closer than 2 meters from any safety lane.
6. Tripwires no closer than every third cluster.

CLUSTER COMPOSITION:

1. No more than 5 mines per cluster.
2. No more than 1 AT mine per cluster.
3. First cluster always on enemy side of strip.

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APPENDIX L

EMPLOYMENT OF FIRE SUPPORT SYSTEMS FOR UNIT DEFENSE

1. GENERAL. The maintenance unit has no organic indirect fire support means upon which it can rely nor does it have a dedicated fire support team (FIST) to assist the commander in defensive planning. It is the responsibility of the commander to plan for fire support. There are three fire support systems available to help defend his unit. They are field artillery, close air support, and attack helicopters. The method of obtaining this support is the same in every case -- the maintenance unit must gain access to the fire support system.

2. FIRE SUPPORT SYSTEM. The mission of the fire support system is to suppress, neutralize, or destroy surface targets with indirect fires and close support aircraft using guns, cannons, rockets, bombs, and missiles.

a. Fire Support Planning Agencies. The fire support coordinator (FSCOORD) is responsible for the effective and efficient use of all fire support means. A FSCOORD establishes a facility to perform fire support planning and coordination at all maneuver echelons from corps to company. These fire support elements (FSE) provide full-time personnel on duty for planning of fires and the day-to-day, mission-by-mission coordination of those fires IAW the guidance of the force commander and the FSCOORD. Remember, every maneuver unit, armor or infantry, will have a trained element available to provide fire support planning assistance.

b. Fire Support System Access. The commander must coordinate with the supported unit or the rear area commander to determine what field artillery units are available to fire in support of the defensive plan. Although the primary mission of the field artillery is to provide fire support to the ground-gaining combat arms on the forward edge of the battle area, there is a secondary mission to support the force as a whole. The commander must determine specific field artillery units available to fire, what specific communications channels can be used to request fire, and any limitations on the use of field artillery fires in the rear area.

3. FIELD ARTILLERY. Direct coordination with supporting artillery units should be made before the company occupies its position. If this is impossible due to mission requirements or the tactical situation, coordination must be made as soon after the unit occupies its position as is possible. Artillery unit personnel will be able to assist in planning more effective fire support for the company if the commander can provide an overlay of the organic weapon positions and a terrain analysis. The artillery unit can then supplement organic firepower as well as

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cover areas of dead space where the fires of the organic weapons cannot penetrate. The purpose of this planning and coordinating of fire support is to shorten reaction time of the artillery unit to deliver fire on the target, increase effectiveness of field artillery support for the defense, and to eliminate problems before they cost lives. Many of the planned targets may not be fired, but they are available if required. If an artillery final protective fire (FPF) is assigned to the company, the commander must plan for its employment. Normally, the FPF, an intensive barrier of prearranged fire designed to prevent an enemy force from crossing defensive lines or areas, will cover the most critical area in the defense plan. An FPF is the most critical field artillery conventional fire and takes precedence over all other types of artillery fire. Only one FPF can be assigned per howitzer battery, and when the FPF is ordered to be fired by the commander of the supported force, the mission is fired at the maximum permissible rate of fire until the FPF is ordered lifted or the battery expends all ammunition. Close coordination between the maintenance company commander and the supporting artillery unit is required to insure that this critical fire accomplishes its mission. A type maintenance company perimeter is shown in figure L-1, with the artillery targets and assigned FPF added to the defense schematic. The artillery targets have been plotted to support the overall defensive plan. If an enemy penetration occurs at an area of the perimeter where a target is not plotted, the company commander can easily shift fires from a preplanned target to the area of the enemy penetration by using a cardinal direction and distance (e.g., from BM 1507; South 150, East 50). Artillery fires will be planned by the maintenance company commander based upon the defensive situation and the advice of field artillery personnel. Targets, which are defined as areas of terrain, personnel, or materiel, are numbered for reference and future firing and will be identified and located to 8-digit coordinate accuracy. Targets in support of the company defensive plan will be planned for a minimum of three general locations as follows:

a. Targets in Front of the Company Position. These targets will cover primary avenues of approach so that all personnel can identify the location of the targets and be designed to engage the enemy at long range if possible. Targets close to the perimeter, within 600 meters, will also be planned to augment the final protective line of crew-served weapons. These targets need to be carefully coordinated with the artillery and, if possible, should be verified by firing a check round at the 8-digit coordinate specified by the company commander.

b. Targets on Top of the Company Position. These targets will slow an enemy penetration and prevent consolidation of the area by the enemy force if the maintenance company is forced to withdraw from the area. Firing of these targets must be strictly controlled and completely coordinated to avoid artillery fire killing or wounding friendly troops.

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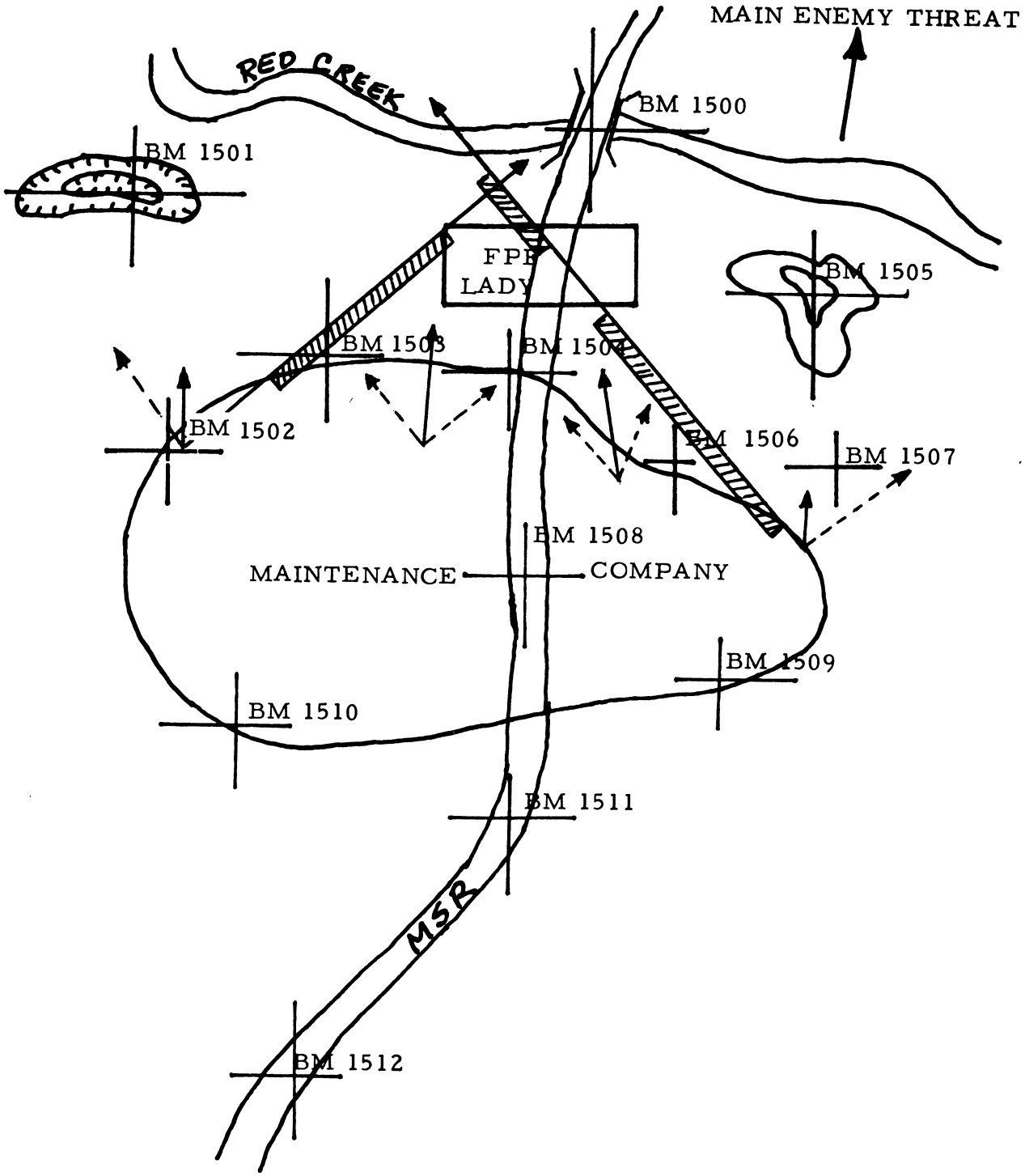

Figure L-1. Field artillery employment in the perimeter defense.

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c. Targets Behind the Company Position. If the company is forced to withdraw due to enemy action, fires must be planned to prevent enemy pursuit or exploitation. The company will be extremely vulnerable during a forced withdrawal and fires planned on the routes of withdrawal to be fired after the company passes that point on the route will slow, impede, and hinder the enemy forces. These fires not only assist in breaking contact with the enemy, but can also be used to support a counterattack to regain the company position if a counterattack is ordered.

4. ATTACK HELICOPTERS. This fire support system can provide an extremely flexible, quick-reacting means of delivering fire on an enemy force, either destroying them or suppressing them until other forces can be assembled to assist the maintenance company. While attack helicopter units are technically maneuver units, and their operating bases are located to the rear, they will have a short reaction time responding to an enemy attack.

a. Capabilities. Attack helicopters can be armed with 2.75-inch rockets, 20mm cannons, 40mm grenade launchers, 7.62mm machineguns, and/or TOW missiles. Not all of the weapons listed may be carried on one helicopter.

b. Limitations. Helicopter operations are limited in periods of limited visibility. The weather and light conditions, as well as the status of enemy air defenses, will be considered when making a decision to employ attack helicopters in a fire support role.

c. Attack Helicopter Employment.

(1) Attack helicopters are normally employed in mass; preferably battalion strength, but not less than company strength. This allows the attack helicopter commander to cycle units into the fight until the mission is completed. The helicopter company will generally operate as three teams, each consisting of three scout helicopters and five attack helicopters.

(2) The sequence of events for helicopter employment has the helicopter unit moving into a holding area while the aeroscouts coordinate with the ground unit. After the information is transmitted and an attack plan developed and coordinated, the attack helicopters move into a firing position, partially unmask to acquire the target, unmask fully to fire their weapons, engage, then remask to move to alternate firing positions or to return to the holding area.

(3) When the aeroscout section contacts the commander, he should provide the following information:

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(a) Target description and location (give the target marking method, if any is used). The friendly unit should be marked only if necessary to establish a reference point from which target location is identified for the pilots.

(b) Information about hazards to flight in the area, such as telephone lines, towers, etc.

(c) Observed enemy air defense capability (small arms, missiles, etc).

(d) Alternate radio frequencies to use in event of lost contact.

(e) Distance and direction from friendly units to the target.

(f) Necessary corrections for subsequent passes if required.

(g) Results of helicopter engagement.

(4) Remember, attack helicopter units are maneuver units. You can obtain immediate support only by coordinating with the rear area commander or with the supported maneuver unit commander. Attack helicopters have a devastating effect on an enemy unprepared for their attack. Maintenance company commanders should coordinate early in the operation on how to obtain their support if the need should arise.

5. CLOSE AIR SUPPORT. Close air support (CAS) is defined as air attack against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. Each CAS mission is flown at the request of ground forces.

a. Capabilities. Depending upon the type of aircraft, ordnance carried includes 20mm or 30mm cannons; 2.75-inch rockets; cluster bomb units; general purpose bombs including 500-, 750-, 1,000-, 2,000-, and 3,000-pound versions; napalm; and guided weapons including missiles and bombs. CAS aircraft have pinpoint accuracy with many of their weapons. For example, the 20mm cannon, used for strafing, can be employed within 25 meters of friendly protected troops.

b. Limitations. There will seldom be enough aircraft to support all CAS requests. Weather and limited visibility conditions may restrict the use of aircraft. Enemy air defenses may restrict delivery options by aircraft. The capability of CAS aircraft to loiter in the area must be considered, especially

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for immediate air strikes. Because of the unplanned nature of immediate air strikes, the aircraft which executes them must be scrambled or diverted from other missions. Their ability to loiter on station, as well as their responsiveness, may be reduced because of these conditions.

c. CAS Employment. Requests for an immediate CAS mission passes from the commander to the nearest fire support element (FSE) with which previous coordination has been effected. At every level of maneuver unit down to battalion there will be a tactical air control party (TACP) which will process CAS mission requests. As a minimum, the request should describe the target, give the desired results, provide the time of attack required, and give the target location. As part of the immediate CAS mission request, the company commander should provide information on how the forward air controller (FAC) can contact him. To accomplish an airstrike, air crews must have, as a minimum, positive identification of the target, positive identification of friendly positions, and clearance to expend ordnance.

(1) Target identification. As a general rule, if the pilot can see the target, he can hit it. The target must be identified as accurately as possible. The unit commander must transmit the target location to the FAC who, in turn, communicates it to the attack aircraft. For an airstrike in a rear area, the FAC will most likely be airborne. An airborne FAC can mark the target with smoke or grenades. If a FAC is not available, the unit may have to provide the mark using tracers, M203 grenade launcher smoke rounds, M72 LAW bursts, or ground reference points.

(2) Friendly position identification. The location of the units nearest to the target is most important, but in a rear area, the locations of other friendly units likely to be overflown should also be considered. The most secure method of transmitting this data is by radio. However, friendly positions may be marked by the use of strobe lights, mirrors, smoke, balloons, flares, and other means.

(3) Corrections. They should be simple, accurate, and fast. Do not do artillery-type corrections. Simply tell the pilot which way to move the impact such as "300 meters north."

6. SUMMARY. Fire support adds significantly to the defensive capability of the unit that can employ it properly. All personnel in the unit should be able to call for and adjust artillery fire. This will insure getting fire support when the unit might need it the most. While maintenance units will not have priority for artillery fires, it will be given all available fire support means to help defend itself if needed. Because the source of that support is usually not known in advance, the commander must be able to employ effectively whatever support he is given.

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References: FM 6-20, Fire Support in Combined Arms Operations.
FM 7-7, Mechanized Infantry Platoon and Squad.
FM 17-50, Attack Helicopter Operations.

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FIRE SUPPORT CHECKLIST

1. Is there fire support available?

   Artillery?

   Attack helicopters?

   Air Force close support?

2. Plan targets for field artillery:

   In front of position

   On position

   Behind position (if applicable)

3. If attack helicopters or ground attack aircraft are available - make sure you can contact them or their control elements.

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APPENDIX M

EMPLOYMENT OF ORGANIC WEAPONS FOR AIR DEFENSE

1. GENERAL. Maintenance units provide lucrative targets for enemy ground attack aircraft due to their lack of mobility and organic air defense weapons. The best possible air defense is to deny the enemy information about the unit's location. The technique described in appendix G (Countersurveillance and Camouflage Techniques) can help defeat the enemy's detection of the maintenance unit location. An attacking aircraft will have little success in attacking a target that cannot be visually spotted. Threat aircraft will use the techniques described in appendix C (The Threat) to conduct an air attack. The commander should insure that unit personnel understand the threat's tactics, capabilities of his aircraft, and techniques that will defeat the attack.

2. RULES OF ENGAGEMENT. With many aircraft in the skies, aircraft identification is a problem. Here are some guidelines. The first one is really easy -- if an airplane is attacking your unit, SHOOT. You are never denied the right of self-defense. If the aircraft is not attacking, the commander has a decision to make. First, you were not seen. Second, you must be able to positively identify the aircraft as hostile. This may be difficult for an untrained observer. If air defense units in the area, such as Vulcan, Chaparral, or Redeye are shooting at a plane, it is a sure bet the aircraft belongs to the enemy. Remember, if you are not being attacked, the commander must give the order to fire on an aircraft.

3. AIR DEFENSE OF A UNIT. Once a maintenance unit is under air attack, it must defend itself. The key to successful air defense is VOLUME of fire. Accuracy is not important -- volume is.

a. The best active protection is volume fire. It is effective against low-flying, attacking aircraft. Weapons are fired at their maximum rate of fire. Every weapon shoots slightly above the nose of an incoming airplane and leads crossing aircraft.

b. The rules for leading the aircraft are simple. The length of two football fields is used only to trigger the soldier's image of a lead. Some will fire using too much lead; some with too little. But, with everybody shooting, enough bullets will go to the right spot in front of the aircraft; and the aircraft must fly into that mass of hot lead. One of the most important points is that once the lead distance is estimated, the rifleman or machinegunner aims his weapon at the AIMING POINT (figures M-1 and M-2) and fires VOLUME FIRE at THAT SINGLE POINT until the aircraft has flown past that point. The

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gunner maintains the AIMING POINT, NOT THE LEAD DISTANCE, so his weapon should not move after he starts firing. The gunner tries to aim in front by the length of two football fields for fast aircraft (jets); 1/2 the length of a football field in front of slow aircraft (helicopters and fixed wings). For hovering helicopters, obviously the fire should be directed at, or slightly above, the aircraft. So, the soldier fires as fast as possible and slightly above the nose of an incoming airplane, and leads crossing aircraft. One man firing does not do much good. Volume means EVERYBODY SHOOTS. Even if the soldier forgets to lead, do not let him forget to shoot.

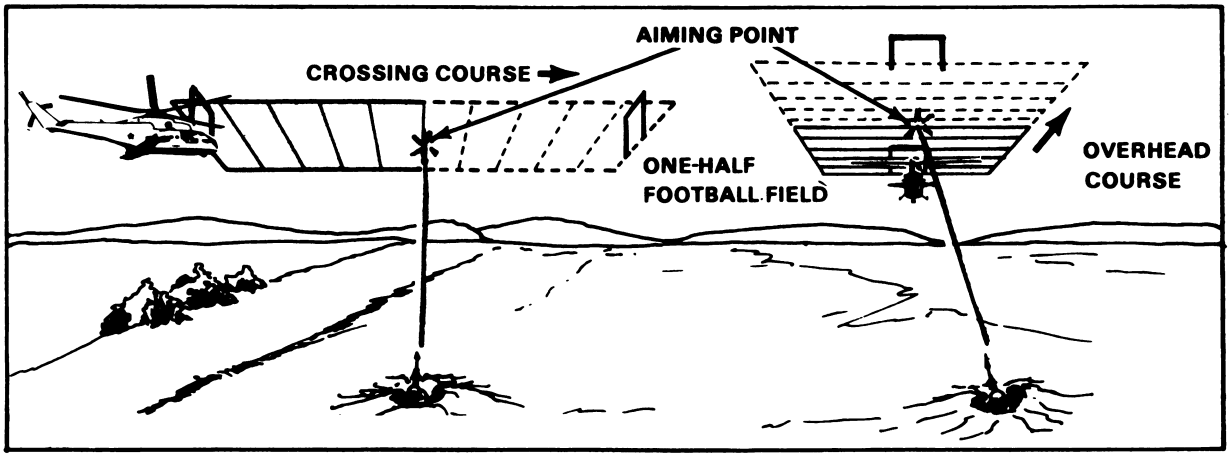

Figure M-1. Firing at slow aircraft with M16, M60, and .50 cal.

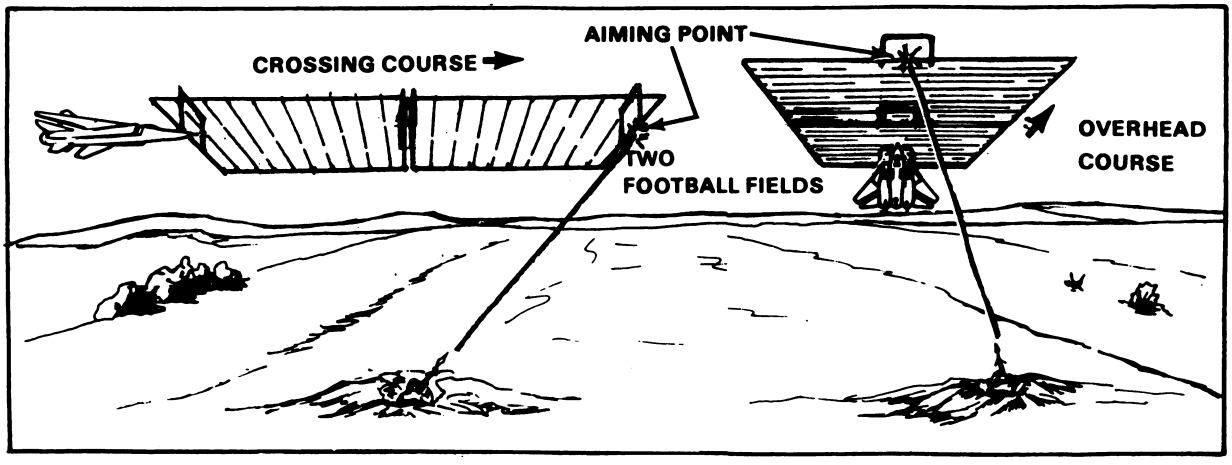

Figure M-2. Firing at fast aircraft with M16, M60, and .50 cal.

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4. AIR DEFENSE FOR A CONVOY. The maintenance unit faces the greatest danger of an air attack while moving in a column. An air attack must be thought of as a type of ambush. Just as security and immediate action drills are practiced to ward off a ground ambush, the unit must train to detect and counter an air attack. The unit can take active and passive measures to protect itself.

a. Passive Measures. The principles of camouflage apply. Soldiers must train to take steps which make it difficult for the pilot to spot the unit. Also, movement draws attention. The unit should carefully reconnoiter the route and then develop a convoy plan which will decrease its vulnerability. Seeing the enemy first allows the unit to take evasive actions. Assign air guard duties to specific soldiers. They should be located throughout the column and should be given specific search areas. If the road march lasts longer than an hour, rotate air guards. Scanning for a long period dulls the ability to spot aircraft. The commander must also decide to use either an open or closed column. The distance between vehicles is determined by the mission, cover and concealment along route, length of road march, type of road surface (dirt, paved, etc), number and types of vehicles in the convoy, threat from enemy (both air and ground), convoy control, ADA support, and available small arms.

(1) Open column (80-100 meters between vehicles).

(a) Advantages include probability of fewer vehicles being damaged or destroyed by air-delivered rockets, cannon, 1,100-pound bombs, or CBUs because of the spread.

(b) Disadvantages include increased command and control problems for the commander. The column is also easier to see from the air, small arms fire is less concentrated, and the convoy is exposed for a longer time; also, open columns take longer to reach the destination.

(2) Closed column (less than 80 meters between vehicles). All the open column disadvantages are overcome somewhat by smaller distances between vehicles. However, the unit presents a bunched-up target which could be an overriding disadvantage. The commander might decide to move his convoy at night to reduce chances of air attack.

b. Active Measures. When aircraft are spotted or early warning of an impending air attack is received, the commander may have to decide to have the convoy continue to march, immediately stop in place, or disperse quickly to concealed positions.

(1) Stop (vehicles go to the shoulders of the road).

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(a) Advantages. The convoy is harder to see than if it continued moving. Once the threat passes, it's easier and faster to continue the march. The volume and density of organic weapons will be greater than if you disperse.

(b) Disadvantages. A convoy stopped on the road makes a good target. The enemy attack has a better chance of causing great damage to the unit.

(2) Continue the march (the mission and/or terrain may dictate the march continue; increase speed).

(a) Advantage. Moving targets are more difficult to hit than stationary ones.

(b) Disadvantages. Detection of convoy is easier; volume and density of small arms fire are reduced.

(3) Disperse and seek concealment.

(a) Advantages. Scatters the vehicles, making it more difficult for the pilot to get multiple hits. Makes it harder for the enemy pilot to detect vehicles once they are dispersed and concealed.

(b) Disadvantages. Makes it easier to spot convoy during initial movement. Takes longer to reorganize the convoy. Reduces volume and density of small arms fire.

c. Training Tip. Everyone will fire from vehicles as they implement the company commander's orders. The key to dispersion is not to make two straight lines out of one long line. Training drivers to go to trees, bushes, folds in the ground, etc, that provide concealment will minimize the vulnerability of the vehicles. Soldiers dismount and take up firing positions after the vehicles have stopped.

5. SUMMARY. Remember, fire at, or slightly above, the nose of directly incoming aircraft and at an aiming point ahead of crossing aircraft. If the commander can coordinate the massing of fires by shooting on command, great! If not, each soldier fires without command. Again, everybody shoots. That's the only way to get volume. Stop firing as the plane begins its climb or when the weapon is no longer aimed in front of the aircraft.

Reference: TC 23-44, Small Arms Defense Against Air Attack.

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APPENDIX N

REAR AREA SECURITY/REAR AREA PROTECTION (RAS/RAP) AND REAR AREA DAMAGE CONTROL

1. GENERAL. The maintenance company will be performing these missions as part of the corps rear and also as part of a larger RAS force. The techniques discussed in the foregoing appendixes will be utilized while performing these missions.

2. SECURITY. Rear area security consists of all measures taken prior to and after an enemy airborne attack, sabotage action, infiltration, guerrilla action, and initiation of psychological or propaganda warfare to minimize the effects of these operations.

a. The missions include:

(1) Relief of attacked installations and units.

(2) Protection of lines of communication.

(3) Denial of drop or landing zones used in airborne/airmobile attacks.

(4) Surveillance of possible guerrilla operating bases.

(5) Finding, fixing, and destroying (within capabilities) enemy forces conducting guerrilla operations.

b. Planning and coordination are critical and will normally be done at battalion or higher level. Some will be done at company level and should include plans for surveillance of the area of responsibility, designation of a reaction force, control of civilian populace, protection of critical rear installations and lines of communication, alert and warning systems, and contingency plans.

c. RAS/RAP is contingent upon early warning OP, LP, and reconnaissance patrols. These must be operated on irregular time schedules and in varying directions and locations.

3. DAMAGE CONTROL. Rear area damage control consists of all measures taken prior to, during, and after a mass destruction attack or natural disaster to minimize their effects.

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a. Some of these measures are:

(1) Prior to attack.

(a) Establish clear lines of authority.

(b) Establish communications and warning systems.

(c) Make plans for reporting information required for post strike analysis.

(d) Organize, equip, and train personnel in rear area damage control operations.

(e) Use cover and concealment and enforce camouflage, light, and noise discipline.

(2) During and after attack.

(a) Rapidly assess damage and its impact on operations.

(b) Control personnel and traffic.

(c) Fire prevention and fighting.

(d) First aid and casualty evacuation.

(e) Protect against NBC hazards.

(f) Emergency water supply.

(g) Salvage operations.

b. Normally, assessment teams, rescue squads, and various other teams are formed to perform these tasks. The maintenance company may have to provide personnel and equipment for one or more of these teams, or provide an entire team.

References: FM 7-20, The Infantry Battalions.
FM 7-30, The Infantry Brigades.
FM 31-16, Counterguerrilla Operations.
FM 31-21, Special Forces Operations.
FM 100-20, Internal Defense and Development.

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APPENDIX O

CONSOLIDATED REFERENCE LIST

A4-6 MAP READING TEC TAPE LIST

1535	9300710013F	Introduction to Land Navigation
1536	9300710014F	Measuring Distances and Azimuths
1537	9300710015F	Converting Azimuths
1538	9300710016F	Terrain Features
1539	930070017F	The Lensatic Compass
1540	930070018F	Navigating with a Map and Compass
1613	9300710161F	Orient A Map by Terrian Association
1615	9300710163F	Determine Location on Ground
1616	9300710164F	Determine Distance while Moving
1619	9300710166F	Bypass Obstacles using Detour Method
2058	0201711313F	Percent of Slope

A4-7 UNIT SECURITY TEC TAPE LIST

1341	9490610002F	Trgt Location: Polar Plot, Grid Coord
1342	9490610003F	Locate a Trgt by Shiff From A Known Point
1343	9490610004F	The Call for Fire
1344	9490610005F	Adjustment of FA Fire Bracketing & Creeping PT 1
1345	9490610006F	Adjustment of FA Fire Bracketing & Creeping Pt 2
1351	9520610051F	Expedient Early Warning Devices
1351	9520610052F	Trip Flares
1391	2430610201F	Crater Analysis Pt 2
1569	9470710068F	Types & Uses of Artifical Obstacles
1570	9470710069F	Constructing Non-Wire Obstacles
1571	9470710070F	Constructing Wire Obstacles
1698	0100716401F	Flame Field Expedients
2063	0201711613F	Use of Binocular Reticle & Worm Formula

A4-10 ORGANIZATION OF PERIMETOR DEFENSE TEC TAPE LIST

	010-0711045	Construction of Fighting Positions Pt 1
	010-0711046	Construction of Fighting Positions Pt 2
	010-0711092	Designation of Primary, Alternate, & Supplementary Fighting Positions for Key Weapons.

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	0100711093	Prepare Platoon Defensive Fire Plan
	0100711093	Direction Platoon Fires in the Defense
	0100711088	Prep & Issue Oral Platoon Defense Order.
	0100711086	Consolidation & Reorganization of Platoon After Enemy Contact in the Defense.
	0100711069	Establishment of Observation Post

A4-11 - WEAPONS FAMILIARIZATION TEC TAPE LIST

1528	9480710005F	Operating the Law
1529	9480710006F	Sighting and Aiming Procedures (LAW)
1530	9480710007F	Employment of the Law
1521	9390710009F	Loading and Unloading the M16A1 Rifle
1532	9390710010F	Disassembly and Assembly of the M16A1 Rifle
1533	9390710011F	Maintaining the M16A1 Rifle
1534	9390710012F	Preventing and correcting common malfunctions (M16A1)
1541	9480710020F	Intro to anti armor weapons
1574	9410710078F	Mechanical Training Part I
1576	9410710079F	Mechanical Training Part 2
1577	9410710080F	Mechanical Training Part 3
1578	9410710081F	The M60 Machine Gun: Functioning
1579	9410710082F	BIPOD Emplacement and Tripod Mounting
1580	9410710083F	The M60 Machine Gun: Prefire Procedures
1581	9410710084F	Firing and Zeroing
1582	9410710085F	Malfunctions of Stoppage
1583	9400710086F	M203 Grenade Launcher: Disassy, Assy, MNTNC.
1584	9400710087F	M203 Gren. Launcher: Malfunctions and Ammunition ID.
1585	9400710088F	M203 Gren Launcher: Zeroing and Target Engagement
1598	9410710116F	The Cal 50 MG: Mechanical Training
1599	9410710117F	The Cal 50 MG: Headspace and Timing
1601	9410710119F	The Cal 50 MG: Firing
1602	9410710125F	Machinegun Target Engagement, Introduction
1603	9410710126F	Machinegun Target Engagement: Good Visibility
1604	9410710127F	Range Cards, Limited Visibility, Part I
1605	9410710128F	Range Cards, Limited Visibility, Part 2
2192	8301916025F	Assy and Disassy of the Cal. 45 Pistol
2193	8301916026F	Load, Immediate Action, Unload Cal. 45 Pistol
2194	8301916027F	Maintain Cal. 45 Pistol

A4-12 - COMMUNICATION SECURITY AND PROCEDURES TEC TAPE LIST

1384	9360610140F	CEOI, Part 1: How To Use The CEOI (FOUD)

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1347	9370610030F	Cover, Camouflage, and Concealment, Part 1
1348	9370610031F	Cover, Camouflage, and Concealment, Part 2
1349	9370610032F	Cover, Camouflage, and Concealment, Part 3

GENERAL INFORMATION TEC TAPE LIST

2477	0434417873F	Deployment of the Redeye
2282	0434411000F	Fund of Air Defense Command Control
2056	0201711311F	Intro: Bridge Classification Symbols
2057	0201711312F	Vehicle Classification
2013	9101710006F	PM-CTASO-900, Rubber Items
2014	9101710007F	PM-CTASO-900, Leather Items
2015	9101710008F	Preventative Maintenance TA50-900, Clothing.

FTX

A6-8 - PRINCIPLES OF PATROLLING TEC TAPE LIST

1659	0100711055F	Control Fire Team Movement
1558	0100711048F	Reacting to Flares
1660	0100711056F	Select Fire Team Overwatch Positions
1888	9460937601F	How to Prepare a Non-Electric Firing System
1889	9460937602F	How to Prepare a Electric Firing System
1890	9460937603F	How to Prepare a Detonating Card Firing System
2039	9351710201F	Armor Vehicle Recognition Part 1
2040	9351710202F	Armor Vehicle Recognition Part 2
2041	9351710203F	Armor Vehicle Recognition Part 3
2255	9114410024F	Basic First Aid Measures: The Lifesaving Steps.
2256	9114410026F	Basic First Aid Measures: Restoring the Breathing
2257	9114410027F	Basic First Aid Measures: Restoring the Heartbeat
2258	9114410028F	Basic First Aid Measures: Stop Bleeding Part 1

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1385	9360610141F	CEOI, Part 2:Message Authentication (FOUD)
1386	9360610142F	CEOI, Part 3: Numeral Cypher System (FOUD)
1387	9360610143F	CEOI, Part 4: OPNS Code and Security (FOUD)

A4-13 - TACTICAL COMMUNICATIONS TEC TAPE LIST

1372	9360610115F	Tactical FM Radio: RT524A and R4421D & Install.
1373	9360610116F	Tactical FM Radio: RT524A and R442; Operation
1374	9360610117F	Tactical FM Radio: RT524A and R442; Maintenance
1378	9360610125F	Field Wire Installation: Equipment
1379	9360610126F	Field Wire Installation: Ties
1380	9360610127F	Field Wire Installation: Aerial and Surface
1381	9360610128F	Field Wire Installation: Splicing
1382	9360610129F	Field Wire Installation: MNTNC & TRBLSHTG
1936	2011134501F	Prep of AN/PRC-770FOP, PT1: Installation
1937	2011134502F	Prep of An/PRC 770FOP, PT2: OP Checks
1938	2011134503F	Prep of AN/PRC-770FOP, PT3: Pre-Sets
2590	2011134552E	Establishing ANET
2591	2011134553E	Opening a NET
2593	2011134556E	Message Format, Part 1
2594	2011134557E	Message Format, Part 2
2598	2011134561E	Repetition Procedures, Part 1

A4--15 - Small Unit Tactics TEC TAPE LIST

1258	0300516386F	Breach and Clear a Mine Field
1525	9420710001F	The Hand Grenades
1526	9420710002F	Hand Grenade Maintenance and Identification
1527	9420710003F	Hand Grenade: Carrying, Throwing and Arming.
1634	9510710246F	Introduction to patrolling
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